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Hemorrhoids often occur as a symptom of cancer of the large bowel. Treating this symptom without searching for its cause is as irrational and futile as treating headache symptomatically and ignoring its possible origin in a brain tumor.

Recent emphasis upon the frequency of multiple primary carcinomas of the large bowel and upon the etiologic role of polyps indicates the necessity for examining the entire colon and rectum in cases where a cancer or a polyp has been found.

Too often the rectal examination is side-stepped in the routine health checkup. Most tumors of the rectum are as accessible as those of the mouth—and in a no less esthetic medium bacteriologically. Yet many physicians abhor rectal examinations—which could reveal about one eighth of all cancers. And these cancers are curable when detected before they metastasize.

Before hemorrhoidectomy cancer must be excluded by careful digital, proctoscopic, roentgenographic and cytologic examinations. Only when all are negative can the patient be told *it's only piles*.

Cover-The silver medal, the American Cancer Society's Annual National Award for distinguished service in cancer control presented to Mrs. Albert D. Lasker. The Award, presented at the Society's Annual Dinner, October 23, 1958, is in recognition of the truly outstanding role she has played in the organization and growth of the Society. The present structure and program of the Society is due, in large measure, to her leadership and vision; her devotion to the cause of cancer control and her willingness to give of her time and energy to this cause are well known to all. She, together with her late husband, established the Albert and Mary Lasker Foundation to help fight the major diseases which kill and cripple mankind. Together, they also helped the American Cancer Society launch its nation-wide research attack on cancer. In 1944, they proposed to the Society-which until then had never raised any funds for research—that they would underwrite a national campaign in 1945, provided 25 per cent of the amount collected was devoted to cancer research. Until that time, the entire amount spent nationally for such research was less than a million dollars from federal and private sources. As a result of that offer and the implementation of that plan, in which the Laskers were immensely active, the American Cancer Society in the last 13 years has devoted nearly seventy million dollars to cancer research.



NEWSLETTER

JANUARY-FEBRUARY, 1959

.Seventh International Cancer Congress, London, July 6-12, 1958. (Continued from November-December Newsletter.)

Graffi (Berlin-Buch): Cell-free filtrates of four transplantable mouse tumors (Landschutz 1 and 2, Ehrlich ascites and SOV 16) have induced a high percentage of generalized myelogenous leukemia when given to newborn mice of various genetic strains. Irradiation or chemical carcinogens increased the leukemic harvest. An agent was spun out of the material -- corpuscular in nature, thermolabile (inactivated in 30 minutes at 65° C.) and residing in the nucleoprotein fraction (although neither RNase nor DNase significantly affected its activity).

Timofejevsky (Moscow): Virus-like globular bodies have been obtained from human cancers (stomach, lung, breast, central nervous system, melanoma, sarcoma and leukoses). Those from cancers of the breast, stomach and leukemic blood have been cultivated successfully on the chorio-

allantoic membrane of chicken eggs.

Nakahara (Tokyo): Studies suggest strongly that a "toxohormone" elaborated by tumors interferes with the liver's utilization of iron in synthesizing catalase.

Fawzy (Cairo): Bilharzia, as a cause of bladder cancer, is a national problem in Egypt. Bladder cancer comprises 40 per cent of the country's total malignant disease incidence. Fifty per cent of patients are dead at three years and 70 per cent at five years.

Franksson (Stockholm): A substitute bladder has

been constructed for use after total cystectomy.

Savitsky (Moscow): Lung cancer, usually detected late, is treated by radical surgical procedure in only 10-15 per cent of cases. Objective tests include multiple cytological examinations of phlegm or bronchial aspirates, complex roentgenographic studies, bronchoscopy and bronchoscopic biopsy. Satisfactory progress has been made in radiotherapy, but radical surgery remains the most effective treatment. A pronounced defect of the lungs and heart

is the gravest contraindication to lung surgery. The author favors the frontal approach in surgery.

Price Thomas (London): Generally speaking, pneumonactomy offers the best chance of relief in lung cancer. In some cases, however, because of the smallness of the lesion or the patient's limited respiratory reserve, a lobectomy is preferable.

Hilton (London): Considerable regression of bronchosenic cancer may follow radiotherapy, rendering an inoperable growth technically operable; in some cases no viable tumor cells can be found.

Higginson (Johannesburg): Cancer of the liver, sinuses, esophagus and Kaposi's hemangiosarcoma are more common among Bantus than among Americans; less common are cancers of the endometrium, cervix and liver in women and stomach and large bowel in both sexes.

Dorn (NCI): A prospective study of causes of death among 290,000 veterans holding GI insurance shows clearly an association between cigarette smoking and lung cancer.

Hueper (NCI): Metals and minerals "incriminated" in the production of cancers of the respiratory tract are chromium, nickel, iron oxide, radioactive metals, arsenic and asbestos. Beryllium is suspect.

Doll (London): It is unreasonable to suppose that the association between lung cancer and cigarette smoking is an artefact. But it does not necessarily follow that smoking causes the disease. Alternatively, it has been suggested: 1) smoking determines the site of cancer in a person who otherwise would develop cancer at another site; 21 a precancerous condition is a factor in inducing cigarette smoking; 3) smoking and lung cancer are both the results of some common factor. The first argument conflicts with the available evidence and no evidence supports the other two.

Sayago and Moroder (Santiago, Chile): In percentage of all deaths, cancer has increased in Chile from 1.3 to 7.9 between 1917 and 1956. This is due mainly to progressive aging of the population and only in part to better diagnosis.

Jussawalla (Bombay): Cancer is steadily assuming the proportion of a public health problem in India. This is mainly due to better control of tuberculosis, malaria and infectious diseases. Cancer, in India, occurs in a (Continued after page 36)



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TOPIC: CANCER OF THE COLON AND RECTUM

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a glance . . .

one-minute abstracts
of the literature
on cancer of the colon and rectum

First Resection of Colon— End-to-End Anastomosis

On March 7, 1843, the Royal Academy of Medicine, Paris, appointed a committee to investigate the work of Reybard, of Lyons, who claimed to have cured a cancer of the sigmoid on May 2, 1833, by ablation of the tumor and the intestine and re-establishing continuity by suturing the two free ends together. The report of this committee (probably the first on new and unproved methods of cancer treatment) contains Revbard's detailed description of the complicated, double, interrupted intestinal suture, with all its needles, threads, loose ends, knots and tufts, that still bears his name. The chairman of the committee reported to the Academy on July 30, 1844, that his committee had studied Revbard's technique as demonstrated unsuccessfully on seven dogs, and had obtained clinical data concerning the patient, Joseph Valernaud, who lived until March 16, 1834, nearly a year after the operation. The surgical specimen had been discarded and there had been no autopsy. It was, therefore, impossible for the committee to learn anything from this case of value to science. Reybard was thanked and complimented upon his enthusiasm, and the report of the committee was filed in the archives of the Academy.

Reybard [Committee: Jobert (Chairman), Blandin and Bérard]: Mémoire sur une tumeur cancéreuse affectant l'S liac du colon; ablation de la tumeur et de l'intestin; réunion directe et immediate des deux bouts de cet organ; guérison. Bull. Acad. Roy. Méd. 9:1031-1043, 1844; also in Ann. Chir. franç. étrang. 11:493-503, 1844.

Conservative Management of Polyps

Polypoid lesions of the lower part of the large intestine must be studied thoroughly before conservative management is recommended. The gross appearance, size, location and feel of the lesion are determined by sigmoidoscopic examination. A biopsy specimen removed by snare excision is best for detecting malignant changes and anaplastic cells beneath the muscularis mucosa. Fulguration or local excision is suitable if the following criteria are fulfilled: (1) the intestine is not fixed to the surrounding structures, and the polyp is freely movable over the underlying muscularis of the bowel wall; (2) the lesion is not indurated or nodular; (3) linear or serpiginous infiltration of adjacent submucosa is not evident; (4) obstruction, manifested by dilation of the bowel proximal to the lesion, has not occurred; (5) the lesion is not ulcerated, and no necrotic defects in the contour are noted; (6) ideally, malignant characteristics are limited to low-grade adenocarcinomatous changes without invasion beneath the muscularis mucosa, However, when gross features of the lesion warrant conservative management, the microscopic appearance does not seem to be the most important prognostic factor. Some patients with anaplastic cells under the muscularis survive for years without metastasis after the polyp is fulgurated. Many patients with rectal polyps that do not satisfy the criteria for conservative management refuse or may not be able to withstand extensive operations because of advanced arteriosclerosis, coronary artery disease or pulmonary disease. Conservative therapy, though never as successful as radical operation for early carcinomatous lesions, may produce good results without morbidity and should be considered as an alternative procedure for equivocal lesions. Of 244 Grade I or II (Broders' classification) adenocarcinomatous polypoid lesions of the lower bowel, 214 satisfied the criteria for conservative management and were fulgurated. Of these patients, 150 have lived at least five years without metastasis; 31 died of unrelated causes; and five eventually had metastatic carcinoma. No information is available about six of these subjects. Invasion of the muscularis mucosa was discovered in 14 of these patients, but carcinoma recurred in only one. Fulguration was recommended by proctologists for 14 other patients, but radical operation was performed. Invasion was noted in only five of these subjects; one postoperative death occurred, and all the remaining patients lived more than five years without metastasis, Fulguration was performed for 16 patients who refused or were unable to withstand the recommended radical treatment. Of these, two died of unrelated causes and nine lived five years without metastasis.

Lochridge, E. P., and Jackman, R. J.: Evaluation of conservative management of certain polypoid lesions of the lower part of the large intestine. Dis. Colon & Rectum 1:101-109, March-April, 1958.

Cancer of the Large Bowel

With scrupulous attention to history and examination the diagnosis of cancer of the colon or rectum should not be missed. Abdominal pain and change in bowel habit and character of the stool are predominant symptoms. The commonest symptom of rectal cancer in an American series was bleeding and this was the second commonest symptom of cancer elsewhere in the large bowel. In a British series bleeding was one of the main symptoms in 10 per cent of cases of neoplasms in right or left colon, in 30 per cent of sigmoid cases, and in 66 per cent of rectal tumors. A history of symptoms suggesting carcinoma of the large bowel should take priority over a normal radiographic appearance. Only when the radiographic studies are positive should they be allowed to outweigh the clinical evidence. Recurrence of carcinoma at the suture line, believed to be from implantations of malignant cells at the time of operation, is now the subject of investigation by several groups, and prophylactic measures are being generally employed. These include isolation of the tumor with tape ligatures placed around the bowel, covering the surface of the lesion and the use of chemical substances designed to kill exfoliated malignant cells carried into the wound and into the abdominal cavity by the surgeon's gloves. Other recurrences are due to incomplete removal of the cancer. Some surgeons maintain that all colonic polyps, adenomatous and papillomatous, large or small, on the right or left side should be considered premalignant and treated accordingly.

Anon.: Cancer of the large bowel. [Leading Article.] Lancet 1:835-836, April 19, 1958.

Multiple Cancers of Large Intestine

The authors think that the number of persons dying from cancer of the colon and rectum each year—35,000 in the United States, 1000 in Switzerland—is best reduced by an attack on adenomatous polyps. Multiple tumors are more common in the digestive tract than in any

other site except the skin. The authors in a single year encountered three cases of dual carcinoma of the digestive tract; two of these were not discovered before operation. In spite of the risk of time consuming and difficult coloscopy during operation, the entire colonic mucous membrane should always be carefully and systematically examined. This is necessitated by the multiple appearance of polyps, their frequent association with cancer of the colon, their potential malignancy, the frequency of multiple carcinoma of the large bowel and the limitations of roentgenographic examination. Repeated follow-up examinations should be made in all cases of colonic polyp or cancer. Occlusion or hemorrhage following resection for carcinoma is not always due to local recurrence; these symptoms may indicate the development of a new, independent, resectable tumor.

Pettavel, J.: Saegesser, F., and Candardjis, G.: Cancers multiples du gros intestin. [Multiple cancers of the large intestine.] Gastroenterologia 89:180-191; disc. 191, No. 3/4, 1958.

Cancer of the Colon before Age 20

That sarcomas are rather common among children is quite generally appreciated. It is less well known that malignant neoplasms occur in epithelial tissues in younger individuals often enough to warrant considering them in differential diagnoses. Two hundred and sixty-two cases of malignant neoplasms of the rectum and colon in patients under 20 years of age have been reported. The author adds two more-one of carcinoma of the sigmoid colon in a youth of 18 and one of adenosarcoma of the rectum in another of 19. The former patient is well and without evidence of recurrence eight years after resection of the tumor and end-to-end anastomosis. The patient with adenosarcoma died nine months after a palliative procedure of permanent type loop colostomy employing the sigmoid colon. Prognosis of malignant neoplasms in children is not good. The longest survival previously reported was seven years. Failure to consider the possibility of these tumors largely accounts for the poor prognosis.

The youngest patient reported was three and a half years old. Appendicitis, tuberculous peritonitis and acute intestinal obstruction are the usual erroneous diagnoses. Accordingly, the patient is subjected to operation without proper preparation for the real condition. Early, radical resection offers the only hope. Removal of benign polyps may prevent development of malignant transformation during childhood or adult life. Bibliography of 18 items includes all previous reports.

Hoerner, M. T.: Carcinoma of the colon and rectum; case reports in individuals under twenty years of age. Am. J. Proctol. 9:277-294, Aug., 1958.

Cancer of Rectum—Palliative Cures

At the Mayo Clinic in the period 1945 through 1949, 128 patients with cancer of the rectum were given conservative treatment, usually referred to as palliative, because of some associated debilitating condition or refusal to submit to conventional radical procedures. Most of these patients were treated by irradiation with radium, fulguration, a combination of the two or local excision. Fulguration immediately followed by topical application of a radium pack was the most satisfactory procedure. Twelve patients still living have not reached the end of the statistical five-year period. Of the remaining 116 patients, 54 lived more than five years after the initial conservative treatment, 6 more than ten years and 24 of the 75 deaths were unrelated to the rectal carcinoma. Palliative treatment, in the opinion of the authors, is curative in more instances than is generally appreciated. Surgeons must frequently choose between a simple operation that is relatively safe and a more extensive one with higher mortality and morbidity. The reasons for conservative treatment in this series, in order of frequency, were: senility and general debility, patient's refusal, cardiovascular disease, metastatic lesions, diabetes, arthritis, cirrhosis of liver, alcoholism and other tumors.

Wittoesch, J. H., and Jackman, R. J.: Results of conservative management of cancer of the rectum in poor risk patients. Surg., Gynec. & Obst. 107: 648-650, Nov., 1958.

Carcinoma of the Colon

Results of treatment of 950 patients with cancer of the colon and rectum at Hartford (Conn.) Hospital between 1941 and 1950 are reported. Ages of the patients varied from 17 to 93 years, with an average of 63. Fifty-five per cent of the group were women. Polyps in addition to the carcinoma were found in 174 (18 per cent) of the resected specimens. There were 44 patients with multiple carcinomas. The finding of a polyp in a resected specimen should alert the surgeon to the possibility of the development of a new lesion later and to the necessity of frequent examination by proctoscopy and barium enema. The absolute 5-year survival rate in this series was 28 per cent. The relative rate in patients for whom 624 operations for cure were performed was 46 per cent. A lower operative mortality and higher rate of curative operations was noted among the women. The operation of choice for carcinoma of the rectosigmoid is abdominal resection. Pullthrough operations give good results in selected cases of carcinoma of the rectum. Palliative resections can be performed with low operative mortality. Advances in surgery of the colon are attributed largely to the antibiotics.

Wilson, J. S., and Tennant, R.: Carcinoma of the colon; a 10-year study. Cancer 11:278-282, March-April, 1958.

Cancer of the Colon

Of 100 patients operated upon for cancer of the large bowel 15 were obviously incurable at operation and 85 offered some hope of cure. In this group of 100 patients 115 operations were performed with a surgical mortality rate of 4.3 per cent. There were 99 adenocarcinomas and one squamous cell lesion. Of the 68 patients operated upon in hope of cure, 42 (62 per cent) have survived for four years or more. No patient died of recurrence more than two and a half years after operation. Seven cases of thrombophlebitis and four wound disruptions were encountered.

Bleeding was the most common first symptom. Cancer of the colon is a disease of considerable significance because (1) it is a common cancer, (2) it is usually easily diagnosed, and (3) its survival rates are better than those of cancers of most other sites,

Bishop, J. F.: One hundred colon cancers. J. Iowa M. Soc. 48:133-139, March, 1958.

Avoiding Colostomy

Colostomy is a valuable procedure in surgery and is often life saving, but many colostomies are unnecessary. Many colostomy patients are miserable recluses in spite of the cheerful reports to the contrary. In many of these patients low resections instead of the permanent colostomies could have been performed. Longevity is as good with low resection as with the abdominoperineal procedure. "Internal" colostomy can often be performed even when colostomy is indicated as a temporary measure. The surgeon with compassion for his patients will do everything possible to prevent leaving them with permanent colostomies. There is no excuse for performing a colostomy upon a patient with obstruction and in the terminal stages of his disease.

Solosko, A.: Avoiding colostomy in colon surgery. Am. J. Proctol. 9:385-391, Oct., 1958.

Cancer Metastatic to the Colon and Rectum

As a result of the more recent graduates in medicine having learned that no physical examination is complete without a thorough digital and proctosigmoidoscopic examination, many secondary growths from other sites palpated and seen in the rectum, are mistaken for primary tumors of the rectum leading to unnecessary radical extirpation. The authors report 49 such tumors of the peritoneal pouch-metastases from the upper part of the abdomen and breast. All of these cases were advanced, but metastases may occur early and be the only signs of invasion. Therefore, these metastases are important in that they may often lead to the previously undiscovered primary site, of which the stomach is the most frequent.

Bacon, H. E.; Villalba, G. L., and Myers, T. B.: Extrarectal metastases from malignant disease of the mammary area and [upper] part of the abdomen simulating primary rectal carcinoma. J. Internat. Coll. Surg. 29:232-246, Feb., 1958.

Cancer of the Distal Colon and Rectum

Removal of the inferior mesenteric vascular lymphatic zone of spread is often necessary for cancer of the distal colon or rectum. More than half of the patients with resectable cancer of the colon and rectum have metastases to the regional lymph nodes. Conventional procedures leave residual cancer in almost half of patients with such spread. An extended exposure allowing removal in continuity of a large sheet of retroperitoneal extramesenteric and intramesenteric tissue, enclosing lymph channels and nodes and blood vessels, is justified in at least one of eight patients. Increased operating time is a drawback, and obesity is a contraindication. Location of the cancer determines whether the operation terminates as a left hemicolectomy, anterior resection or rectal excision.

Ault, G. W.: A technique for cancer isolation and extended dissection for cancer of the distal colon and rectum. Surg., Gynec. & Obst. 106:467-477, April, 1958.

Multiple Cancers of the Colon

In a consecutive series of 1788 cases of carcinoma of the colon and rectum 162 (9.2 per cent) had primary multiple cancers. In the large bowel alone multiple primary cancers were noted in 5.3 per cent. Among the men of the series the lesions were confined to the gastrointestinal tract in 67 per cent; in women, the genitourinary tract was involved in 40 per cent. The physician must be alert to the possibility of multiple cancers, especially among patients with carcinoma of the colon or rectum. Any patient with cancer of the large bowel has an increased risk of developing cancer at other sites simultaneously or at different intervals. Preoperative investigation should include careful physical exam-

ination, proctosigmoidoscopy and roentgenographic study. In men, upper gastrointestinal roentgenograms are advisable. Even the slightest gastrointestinal symptom in women should be studied by barium administration. During operation the entire colon and all abdominal organs should be explored. Coloscopy may reveal lesions missed by palpation. Every patient operated upon for cancer of the colon or rectum is a candidate for an additional primary cancer even though he survives 5, 10 or even 20 years, and should remain on the cancer detection list for frequent thorough examinations.

McGregor, R. A., and Bacon, H. E.: Multiple cancers in colon surgery; report of 162 cases. Surgery 44:828-833, Nov., 1958.

Polyps and Cancer of the Colon

Evidence is presented to show that the annual incidence of carcinoma of the colon (45 per 100,000) can be accounted for by the frequency with which adenocarcinoma arises in nonpolypoid colonic mucous membrane without involving the poorly supported theory of the origin of adenocarcinomas of the colon without adenomatous polyps. The frequency distribution of adenomatous polyps and cancers of the colon are not the same. The polyps are more evenly distributed throughout the colon than are the cancers, and the unit percentile frequencies of cancers are higher than those of polyps in the cecum, sigmoid colon and rectum, and lower than those of polyps in the other parts of the colon. Among 425 adenomatous polyps 43 contained cells with the microscopic appearance of cancer with but one of the 43 having the abnormal cells questionably infiltrating the polyp stalk. Among 325 cancers of the colon no residuum of adenomatous polyp was seen. There appears to be little evidence for and much against the theory that adenomatous polyps degenerate into infiltrating, metastasizing carcinomas of the colon.

Spratt, J. S. Jr.; Ackerman, L. V., and Moyer, C. A.: Relationship of polyps of the colon to colonic cancer. Ann. Surg. 148:682-696; disc. 696-698, Oct., 1958.

Cancer of Colon with vs. without Polyps

The increased survival rate of patients with carcinoma of the colon with associated polyps is explained by host resistance. A group of 59 patients with adenocarcinoma of the colon or rectum without polyps had a six-year survival rate of 46 per cent; a group of 28 with histologically proved adenomatous polyps, 75 per cent. In those patients having lymph node metastases, there was 50 per cent survival in the group with polyps and 25 per cent in those without polyps, showing greater resistance in the presence of polyps. The longer duration of symptoms in the polyp group is similarly interpreted. When adenomatous polyps coexist with frank adenocarcinoma there is a demonstrable and statistically significant increase in survival time.

Cole, J. W.; O'Hara, R. S., and Holden, W. D.: Observations on the relationship of benign adenomatous polyps of the colon to the natural history of colonic cancer. Surg., Gynec. & Obst. 107:651-654, Nov., 1958.

Polyp vs. Cancer

It has been the author's policy to treat conservatively polyps of the colon and rectum that appear as benign tumors even in face of pathological reports of cancer in these polyps. Survival rates in a series of 86 patients appear to justify this "treat and observe" procedure. More radical means of ablation are used when conservative measures fail. No hard and fast rules can be made for the treatment of these lesions as there are so many variable factors. Soft, nonulcerative and freely movable polyps were treated as benign. If the tumor is a papillary cancer the patient must undergo resection. At the time of the colotomy the author wants to know from the pathologist only whether the tumor is a benign adenoma in which there is cancer or whether the whole tumor is a cancer. In discussion Dr. Bacon said that he thought that the recurrence rate, 10 to 15 per cent, in this series was too high, that operations should be more extended rather than more conservative, that if cancer is to be cured it should be cured at the first operation and not the second or third, and that progress has gone backward ten years as far as the control and prevention of cancer of the colon is concerned. The author replied that conservatively treated "malignant" polyps rarely metastasize or kill the patient, that radical operation in this group would be needless, and that morbidity, mortality and disability rates would outweigh the "benefits" intended by the surgeon.

Turnbull, R. B.: Carcinoma in polyps of the colon and rectum; a study of 86 treated patients. Dis. Colon & Rectum 1:44-47; disc. 47-48, Jan.-Feb., 1958.

Precancers of Colon and Rectum

A precancerous lesion is one of a nonmalignant nature which clinical experience has shown to be frequently followed by cancer. Three lesions in the colon and rectum are undoubtedly precancerous: familial polyposis, solitary or localized adenomas and chronic colitis. The risk of cancer is far greater in the first than in the other two conditions. In all three, epithelial proliferation is proceeding at a rapid pace. This proliferation is neoplastic in origin in familial polyposis and rectal adenoma, but it is reparative in ulcerative colitis. Malignant growth is more likely to develop from proliferating or regenerating than from quiescent epithelium. The treatment of polyposis uncomplicated by rectal cancer is total colectomy with ileorectal anastomosis. Tumors of familial polyposis are rarely present in infancy and most commonly develop in childhood or early adult life. During this early period, members of polyposis families should be examined every two or three years, or immediately if intestinal symptoms develop—in order to determine whether they have inherited the dominant gene. After the age of 40, if no symptoms of polyposis have appeared and if sigmoidoscopic examination is negative, polyposis is unlikely to appear later. A solitary or localized rectal polyp which appears to be benign clinically and which is reported by the pathologist to contain a focus of carcinoma is adequately treated by local ablation. The patient is watched for local recurrence and for the necessity of more radical treatment. Cancer is more likely to occur as a complication of ulcerative colitis in the healing phase when medical supervision is apt to be relaxed.

Dukes, C. E.: Pre-cancerous conditions of the colon and rectum, J. Roy. Coll. Surg. Edinburgh 3:182-192, March, 1958.

Colotomy

Colon surgery is becoming a more exact technique. With modern adequate preoperative preparation and postoperative care, extensive colotomy is a safe, rapid and accurate method of locating elusive hemorrhage and potentially malignant lesions of the colon. Early detection and prompt surgical treatment of such lesions will reduce the death rate from cancer of the colon. Polyps of the large bowel are premalignant lesions. Palpation through the intact bowel, transillumination, endoscopy and coloscopy can no longer be considered adequate examination to rule out malignant colonic lesions. In the past six years the author examined 33 patients by extensive colotomy without a death, Two thirds of these patients were found to be harboring unsuspected additional malignant lesions of the colon, the immediate treatment of which increased longevity of the patients.

Collins, D. C.: Extensive colotomy for the intraliminal location of elusive polyps, ulcers, and tumors; a preliminary clinical report. Am. J. Proctol. 9:47-54, Feb., 1958.

The Index Finger in Rectal Cancer

The part of the bowel most subject to cancer and the prostate are accessible to digital examination. By cadaver and autopsy dissections the pelvic landmarks—bones, ligaments, muscles, nerves, arteries—that can be reached by the index finger were determined and presented in practical and clear illustrations. A study was made to determine the accuracy of digital examination in localizing and identifying neoplasms involving the terminal portion of the colon and adjacent structures. In 25 per cent of 100 cases in which abdominoperineal operations were performed, the estimate of the location of the tumor by

digital examination by the clinician was identical with the estimate by the pathologist. In another 25 per cent these two estimates differed by 4 cm. and in 39 per cent by 1 cm.; but there was little difference in the over-all average of estimates. Usually the lesions 12 to 13 cm. above the anal rima can be palpated by digital rectal examination.

Furnas, D. W., and Birnbaum, W.: Interpretation of digital examination of the rectum. Dis. Colon & Rectum 1:365-371, Sept.-Oct., 1958.

Extended Procedures for Colon Cancer

"Surgery of malignant disease is not surgery of organs; it is the anatomy of the lymphatic system" (Moynihan). The authors, impressed with the truth of this dictum, extended the conventional surgical curative procedures for cancer of the left colon and rectum to include not only high ligation of the inferior mesenteric artery but also unusually extensive lymphadenectomies. The anatomical relations of the lymphatic drainage of the large bowel are reviewed in detail from the surgical standpoint and the operative procedures for removal of the entire lymphatic system draining the left colon and rectum are given step by step. A group of patients treated by this more extended lymphadenectomy is analyzed. There were no surgical deaths. The five-year survival rate was increased by five per cent by this nodal dissection. The authors consider such improvement in survival to compensate well for the additional hour spent at operation.

Bacon, H. E.; Dirbas, F.; Myers, T. B., and Ponce de Leon, F.: Extensive lymphadenectomy and high ligation of the inferior mesenteric artery for carcinoma of the left colon and rectum. Dis. Colon & Rectum 1:457-464; disc. 464-465, Nov.-Dec., 1958.

Against Recurrent Colon Cancer

Improved electrolyte balance, antibiotic bowel sterilization, corticosteroids for stress reactions, blood replacement and epidural anesthesia have contributed greatly toward lowering mortality and decreasing morbidity in cancer of the large bowel. However, the usual reports of 50 per cent five-year and 39 per cent ten-year

survival indicate the need for further improvement of operative technique. To this end the authors extended the usual measures against recurrence to include meticulous routine coloscopic search for adenomatous polyps in each bowel segment before anastomosis, aortoiliopelvic lymphadenectomy, and the lavish, "all-out" use of the cancerocidal product, clorpactin, against cancer cell implantation. A 0.5 per cent solution was used in all radical resections for cure-in the cleansing enemas, with the barium solution, and, at operation, to saturate the pad covering the portion of the bowel containing the tumor. by injection into the bowel between, below and above the ligatures, for repeated immersion of gloves and instruments, for intraperitoneal flushing and for lavage of the wound after closure of the peritoneum. The attention of the operator is fixed at all times, before and after the operation, on all possibilities for cancer cell seeding and clorpactin solution is applied freely. In the authors' hands these refinements in prevention of recurrent cancer of the colon and rectum have resulted in a substantial increase of the five-year survival rate.

Bacon, H. E., and Berkley, J. L.: Refinements in prevention of recurrent carcinoma prior to and during resection of the colon and recrum; preliminary report. J. Internat. Coll. Surgeons 30:539-546, Nov., 1958.

Sphincter Preservation in Rectal Cancer

The records of 268 patients with rectal cancer who underwent combined abdominoperineal resection with preservation of the sphincter were analyzed and compared with patients given the Miles operation. Postoperative complications were similar to those reported by Babcock and Bacon -urinary retention in 26.4 per cent, presacral infection in 20.8 per cent, retraction or slough of the perineally transplanted sigmoid in 13.4 per cent, and impotence in 10.9 per cent. Satisfactory fecal control was obtained in 77.7 per cent of the 211 patients from whom this information was obtained, compared to 99.3 per cent in Bacon's series. The operative mortality was 3.4 per cent. Of a group of 155 who had undergone operation with hope of cure, 55.5 per cent survived for 5 years. When the lesion was 5 to 10 cm, above the anal margin the five-year survival rate was 52.7 per cent; in the group without nodal metastases, 72.6 per cent; with metastases 27.6 per cent. Thus it is seen that the results of combined abdominoperineal resection with preservation of the anal sphincter, for carcinoma of the midportion of the rectum and of the upper portion of the rectum when anterior resection is impossible, compare favorably with those of the Miles operation.

Waugh, J. M., and Turner, J. C., Jr.: A study of 268 patients with carcinoma of the midrectum treated by abdominoperineal resection with sphinter preservation. Surg.. Gynec. & Obst. 107:777-783, Dec., 1958.

Colostomy

The surgeon must realize and manage the emotional as well as the functional disturbances of his colostomy patients with the objective of making useful citizens of them. The usual indications for colostomy are obstruction from tumors of the colon or nearby organ, to safeguard a difficult anastomosis and when the bowel distal to the site of colostomy must be resected. Other indications are massive perineal infection, rectovaginal and sigmoidovesical fistulas and injuries to the rectum. The complications of colostomy are stricture at skin or fascial level, retraction, prolapse, adjacent hernia, necrosis of the terminal segment and fistula formation. In 18 cases of mucocutaneous primary colostomy but one complication arose, a case of retraction requiring surgical correction. Complications not due to the construction of the colostomy are formation of adenoma at the colostomy mouth, perforation of the bowel by the patient with the irrigation tube, skin irritation and stricture by metastases in the abdominal wall. In discussion, Boling (Atlanta, Ga.) presented several patients with colostomies including a grocer, a dental assistant who stands eight hours a day and a swimming instructor.

Castro, A. F.: The colostomy; technic, management and complications. South. M. J. 51:1382-1384; disc. 1384, Nov., 1958.

Reeping up

Breast Cancer Growth

Methods of examination for the detection of early breast cancer need re-evaluation. Roentgenograms may reveal carcinoma long before the tumor becomes palpable. Clustered punctate calcification usually is a sign of carcinoma. In six patients with breast cancer, roentgenographic studies were made at the time of the first visit and again shortly before operation. In retrospect, all tumors could be visualized on initial films, which were made four months to nearly four years before operation. At the time of operation, only two of the tumors were palpable and only one patient had axillary lymph node metastasis. Average rates of monthly tumor growth were calculated on the basis of an exponential growth pattern. A carcinoma in situ did not grow during the period of observation. The sizes of two duct and two circumscribed carcinomas increased slowly, at a rate of about 3 to 5 per cent a month. A scirrhous carcinoma grew rapidly-29 per cent a month. The significant variation in growth rates may have been due to differences in tumor types.

Ingleby, H.: Moore, L., and Gershon-Cohen, J.: A roentgenographic study of the growth rate of 6 "early" cancers of the breast. Cancer 11:726-730, July-Aug., 1958.

Endometrial Cancer

Carcinoma of the endometrium occurs occasionally in young women. Of 191 patients with carcinoma of the endometrium seen at Mercy Hospital, San Diego, in a ten-year period, 16 were less than 40 years old, the average age being 36. The symp-

tom common to all patients was irregular bleeding. Weights of the 16 women were normal for this age group. None had diabetes or hypertension. Using Broders' classification, nine patients had Grade I, four had Grade II, one had Grade III and two had Grade IV carcinoma. Since approximately 40 per cent of diagnostic curettages in San Diego are done in the offices of private physicians, this office procedure is evidently of great value for detection of endometrial carcinoma in the early stages.

McGee, W. B.: Carcinoma of the endometrium in women under forty years of age. Obst. & Gynec. 11: 388-390, April, 1958.

Cervical Cancer Detection

Direct contact cervical and endocervical smears assure cytologic examination of the squamocolumnar junction, the site of over 90 per cent of cervical cancers. These biopsy-like smears contain a greater concentration of well preserved malignant cells and can be screened in much less time than conventional vaginal pool specimens. The cervix is exposed with a vaginal speculum and the vagina and cervix are gently cleansed with cotton. The slide, 1 by 7/8 in., held in a carrier with a long, slightly curved handle, is placed so the os is centered, firmly and gently pressed against the entire face of the cervix, and rotated slightly to either side. An endocervical specimen is obtained with a narrow wooden stick, rotated 360 degrees from which mucus and cells are transferred onto a second small slide. Slides are then placed, smear side up, in equal parts of 95 per cent alcohol and ether. Cervical

with Cancer



epithelium, usually one cell in thickness, is accurately transferred without distortion, overlapping or crowding, in the manner of a cellular photograph. Because of the cohesive deficiency of malignant cells, smears from a patient with preclinical carcinoma contain a great number of pre-exfoliated cells in a state of good preservation, permitting almost instant detection.

Trifon, H. M.: Detection and localization of preclinical carcinoma of the cervix by contact smears. Surg., Gynec, & Obst. 106:495-501, April, 1958.

Epidemiology of Cancer

The Department of Agricultural Chemistry of North Wales is pursuing research into a correlation of the incidence of cancers of various sites with the chemical composition of the soil from the residences of persons who have died of cancer. Two tentative associations have been found: zinc and chromium concentrations are higher in garden soils from houses where persons have died of stomach cancer after 15 or more years' residence than in soils of similar gardens elsewhere in the same area where persons have died of causes other than cancer or of cancer after less than two years' residence. Cobalt, iron, lead, titanium and vanadium showed no such statistical association. The rationale may depend upon the essentiality of zinc in the molecule of carbonic anhydrase and in that of insulin. Zinc may be concerned with the glycolytic processes of tumor cells. Since the zinc-cancer association is evident in areas outside North Wales it cannot be held responsible for the excess mortality from stomach cancer in that region. The same investigators are next planning to analyze common garden vegetables grown in "cancer" and "noncancer" soils.

Anon.: Cancer and soil. [Annotations.] Lancet 2:407, Aug. 23, 1958.

Teen-age Smoking and Cancer of the Lung

At the Army (British) Chest Center five cases of lung cancer in patients aged 18 to 23 years were seen in a period of two years and four months. All were anaplastic carcinomas composed of oat cells, round cells or both. Two of the five patients were considered to be inoperable; they survived less than three months. Survival times for the three operated patients averaged eight months. One patient died 17 days after the onset of his first recorded symptoms. The course of the disease in these young patients was very rapid. One 23-year-old soldier had smoked 10 to 20 cigarettes a day for some years. Another 19-year-old had smoked 20 to 40 cigarettes daily since the age of 14.

Large, S. E., and Morgan, W. K.: Bronchial carcinoma in young adults. Brit. J. Tuberc. 52:185-189, July, 1958.

Surgical Advance in Abdominal Tumors

Among the many important contributions to the progress of surgery in the past 16 years are: the discovery of sulfonamides and antibiotics, the extended application of the giving of blood, the maintenance of proper fluid and electrolyte balance by intravenous injection of replacement agents, the use of gastric and intestinal intubation with suction by catheter and Miller-Abbott tube, and better controlled anesthesia. It is now possible to perform more radical operations with increased safety, but the more radical operation is not always the optimal one. Lahey and Marshall found that the survival rate following total gastrectomy for malignant lesions was not larger than that following subtotal gastrectomy, and that postoperative function was not nearly so good. The author uses total gastrectomy only when subtotal removal would be inadequate for removal of the malignant process and tissues for 4 cm. beyond. However, the proportion of total to subtotal gastrectomies in the author's experience is increasing. His five-year survival rate in subtotal gastrectomies increased 180 per cent during 1940-1950, as compared with the earlier period. With improvements in surgical techniques and management partial hepatectomies are now possible without excessive risk, and the operative procedure is not difficult. Partial hepatectomy is now performed for some malignant lesions, curatively in primary and palliatively in metastatic lesions. The use of broad spectrum antibiotics has greatly improved the results of surgery of the colon for malignant neoplasms. More operations preserving the rectal sphincter are now being done.

Walters, W.: Advances in abdominal surgery. A. M. A. Arch. Surg. 76:969-980, June, 1958.

Registries in Cancer Control

In Norway an efficient system of cancer registration has been maintained since 1952. Its records show that such systems of registration stimulate interest in cancer detection, bringing cases to notice earlier, and reveal geographical trends in mortality, such as a gradual increase in thyroid cancer from south to north. Diagnostic cross-checks give useful warning against too literal acceptance of apparent differences in urban and rural cancer mortality. The Norwegian Cancer Society, in a prospective study, is recording data, answers to specific questions, on the menstrual and reproductive histories of a large number of apparently healthy women.

whose subsequent experience of breast cancer will be determined by intensive follow-up through the cancer registration system. In the next few years much will be learned by this progressive, cooperative study.

Pedersen, E: Norwegian Cancer Registry. Paper read before the Seventh International Cancer Congress, London, July 6 to 12, 1958.

Carcinoma of the Cervix

Although adequate irradiation alone for all stages of carcinoma of the cervix is at present the preferred therapy, the results of combined irradiation and radical surgery in a selected group of patients are good enough to warrant further use of the method. However, long-range study of a large number of patients is necessary to ascertain the true worth of such management. Radical surgery is advised when age, general health and physical condition permit, except when carcinoma is beyond the early phase of stage III. Operation is usually not performed until 12 to 16 weeks after completion of radiation therapy; by that time, almost all of the effects of irradiation have been exerted upon the foci of cancer in the pelvis. However, when the response to irradiation is poor, operation is performed as soon as possible. Full irradiation before radical pelvic surgery for carcinoma of the cervix decreases the hazard of spreading viable cancer cells during operation.

Stevenson, C. S.: The treatment of carcinoma of the cervix with full irradiation therapy followed by radical pelvic surgery; first progress report on an experimental series. Am. J. Obst. & Gynec. 75:888-898, April, 1958.

Sarcoma of Breast

Primary sarcoma of the mammary gland is a distinct pathologic entity. The lesion may contain one or more kinds of malignant mesenchymal tissue. Fibrosarcoma is the most common histologic pattern. Malignant epithelial tissue—adenosarcoma, adenofibrosarcoma or cystosarcoma phyllodes—may be mixed with sarcoma. Palpable involvement of the axillary lymph nodes is of little importance in de-

termining appropriate surgical treatment or the ultimate course of breast sarcoma. True primary sarcoma of the breast rarely invades regional lymph channels. Metastasis is blood-borne, occurring oftenest in the lungs. Skin involvement is rare, although ulceration sometimes appears. If no malignant epithelial elements are found in fresh-frozen sections, simple mastectomy, with excision of the pectoral muscles, is adequate. Lesions containing an associated carcinomatous component should be treated by radical mastectomy. Recurrent sarcoma of the breast is best treated by wide local excision.

Botham, R. J.; McDonald, J. R., and Clagett, O. T.: Sarcoma of the mammary gland. Surg., Gynec. & Obst. 107:55-61, July, 1958.

X-Ray Danger

Of 161 patients given X-ray therapy for malignant growths of the mouth and neck, ten were found to have radiation myelitis of the cervical spinal cord which was fatal in five cases. Similar central nervous system damage has been frequently recorded. Radiation damage to the lung has been described in many cases. Four patients have been reported to have electrocardiographic changes following X-ray treatment of the thorax. The threat of leukemia from radiation seems real enough, evidence coming from studies of patients with ankylosing spondylitis, from the incidence of leukemia in children given X-ray treatment in infancy for enlarged thymus, from the increased death rate among radiologists, and from the death rate from leukemia following atomic explosions. Radiotherapy is of immense value in certain malignant growths, especially cancers of the skin, lip, tongue and uterine cervix and as a palliative for many other types of neoplastic disease. Prophylactically, irradiation of the abdomen after unilateral orchidectomy for seminoma is of value. It was this use of X rays that called attention to the complication of nephritis. The radiotherapist may seem somewhat uncritical of the side effects which alarm his colleagues. He may focus his attention on the malignant growth. He knows that the

patient's survival depends on its eradication and, therefore, makes the primary
treatment as radical as possible. Radiotherapy should not be isolated. It should
be part of the general scheme and those
who conduct it should maintain constant
contact with physicians and surgeons in
diagnosis, treatment and follow-up. Radiotherapy is a powerful weapon which can
be fatal to both friend and foe; and the
whole resources of medicine are required
to insure that its edge is turned always
against the invader.

Anon.: Incidental dangers of X-ray therapy. [Leading Article.] Lancet 1:33-34, Jan. 4, 1958.

Health Examinations and Cancer

Every physician's office should function as a cancer control center. Only in this way can the greatly increasing demand of the public for periodic health checkups for cancer prophylaxis and diagnosis be met. Extended use of practical office procedures could, by early diagnosis, result in saving the lives of half instead of the present one third of cancer patients. In the control of cancer the general practitioner is indispensable. If the busy physician will keep cancer in mind when he examines a patient with the simple basic clinical tools available to all he will detect many cases of early cancer. Cancer of the skin, lips, mouth, tongue, vulva and penis are visible. Cancer of the vagina, rectum, sigmoid, cervix, urinary bladder, larynx, bronchus, stomach, esophagus, nares and pharynx are visible with instruments. Cancers of the breast, rectum, uterus, prostate, ovaries, bones and testis are palpable. Cancers of the liver, small intestines, stomach, pancreas, lungs, kidneys, brain and bone are diagnosed by X ray. For examinations the cancer-conscious physician cannot make in his office he refers the patient appropriately. All statistical studies of cancer show higher cure rates in cases treated before metastases occur. The general practitioner is the key man in bringing the cancer patient to early diagnosis and prompt treatment.

Nelson, H. M.: Periodic health checkups and cancer Med. Times 85:1266-1274, Nov., 1957.

Castration in Breast Cancer

Oophorectomy is the treatment of choice in generalized, recurrent or metastatic cancer of the breast in women who are menstruating or have significant ovarian activity. Response to complete surgical castration gives an indication of the future management of the case. Unless there is a remission following castration, no great benefit can be expected from other endocrinologic ablations or administrations. The authors consider castration by surgery, rather than by irradiation, to be the only reliable method of gonadal deprivation. In a group of 191 women, at Memorial Center (New York), 37 per cent showed measurable breast tumor regression, and 45 per cent showed subjective improvement following oophorectomy, Of the 143 women still menstruating, 44 per cent had objective remissions of an average of more than 14 months. Probability and duration of responses were less in patients with intra-abdominal metastases, particularly to the liver. In the group of patients whose mastectomy was performed more than two years before castration there was a higher remission rate. There were five postoperative deaths—three with advanced pulmonary disease and two with severe hypercalcemia. Oophorectomy was effective in but few postmenopausal women.

Treves, N., and Finkbeiner, J. A.: An evaluation of therapeutic surgical castration in the treatment of metastatic, recurrent, and primary inoperable mammary carcinoma in women; an analysis of 191 patients. Cancer 11:421-438, Mar.Apr., 1958.

Antibiotic Cancer Therapy

Cancer cells are possibly equivalent to mutated microorganisms that may be killed or stopped in growth and multiplication by antibiotic chemical compounds. Hence, the existing brand new antibiotics are being screened for selective cytotoxic and cytostatic effects on tumor cells, based upon biochemical differences between normal and malignant cells. The preliminary screening is applied to biochemically mutant microorganisms, and caution must be used in extrapolating results so ob-

tained to the treatment of malignant neoplasms. Biochemical progress being made today represents steady and considerable advance. The rapidity with which information is acquired and the frontiers of biochemical knowledge are advanced may soon outstrip man's capacity of correlation.

Gause, G. F.: Antibiotics against cancer. Paper read before the Fourth International Congress of Biochemistry, Brussels, September 1 to 6, 1958.

Colpomicroscopy

The cervixes of 165 selected patients were studied by the technique of colpomicroscopy. Of these, 154 were normal or showed benign atypical changes in the cervical epithelium and 11 showed proved cancers. This technique is not designed to replace, but to supplement, cytologic and biopsy examinations of the cervix. This newer method permits repeated intensive inspection and observation of the cervix without disturbing the epithelium or causing undue discomfort. Permanent photocolpomicrographs can constitute a record upon which to base future review, study and teaching. The cytologist is assisted by these records and the colpomicroscopist is helped by the records of Papanicolaou smears. The new technique is advantageous in selecting appropriate areas for biopsy. In the use of the colpomicroscope only the superficial layers are visualized. This technique should be used only in those cases in which the cervix either appears normal or presents only a minimal lesion. Borderline cellular changes make colpomicroscopic evaluation difficult. Benign atypias of inflammatory and regenerative processes and those indicating interchange at the squamocolumnar junction may cause confusion in interpretation even though polychromasia and pleomorphism are variable and not present to the degree ordinarily seen in malignancy. The instrument and its use are described in detail. Excellent color illustrations of typical lesions are presented.

Wolfe, L. A.: Colpomicroscopy: its value in the microscopic examination of the uterine cervical epithelium in vivo. Am. J. Obst. & Gynec. 76:1163-1171, Dec. 1958.

Adenomatous Polyps of the Rectum and Colon

Curtice Rosser, M.D., and Robert A. McGregor, M.D.

Malignant disease in all of its phases from diagnosis through treatment presents a great problem to the medical profession. Diagnosis and treatment of a potentially malignant disease before actual malignancy occurs constitutes the ideal management. Adenomatous polyps of the rectum and colon offer one of the few opportunities encountered in medicine today to eradicate a potentially malignant disease before it has become frank cancer. The management of adenomatous polyps of the rectum and the colon has received much space in the literature during recent years and their significance, as well as the proper treatment, is still a debated subject. It is our purpose to review briefly the current literature and a personal series of cases and present a logical method of therapy in the light of our present knowledge of this disease.

The relationship of adenomatous polyps of the rectum and of the colon to carcinoma of these organs is now well documented by many observers and is generally accepted. It has been pointed out that the distribution percentages of polyps and cancer of the rectum and colon are almost identical; that the incidence of polyps and cancer varies proportionately in the two sexes and various races; and that there is a definite time lag between the formation of adenomatous polyps and the development of carcinoma of the rectum and the colon. There is abundant histologic and cytologic evidence showing that adenomatous polyps may undergo malignant change and that most, if not all, cancers of the rectum and the colon originate in pre-existing polyps. Some observers, therefore, contend that adenomatous polyps should not be considered benign or premalignant but rather, true malignant neoplasms at an early stage of development. This concept, combined with the high incidence of multiplicity of polyps, has led some surgeons to advocate extensive and radical surgical procedures for single polyps. Others, however, have taken the opposite stand and advocate only the most minimal procedure unless invasive carcinoma is present.

The exact incidence of adenomatous polyps in the general population is, of course, unknown; however, the increasing practice of the large clinics and medical centers of including proctosigmoidoscopy in the routine physical examination is providing more information. It is usually stated that 3 to 10 per cent of the general population will be found to have adenomatous polyps of the colon or the rectum; however, it was recently reported that 11.5 per cent of 7608 patients examined at the Cancer Detection Center of the University of Minnesota were found to have polyps upon initial examination and an additional 7.7 per cent were found to have polyps on subsequent examinations; thus, 19.2 per cent of patients exhibited polyps on at least one examination.7 Similar reports from the Mayo Clinic have indicated an incidence of 12 per cent and 10 per cent in patients 45 years of age or older, 10, 11

Classification

There is apparently still some confusion in the literature about a proper classification of polyps of the colon and the rectum. If the general term "polyp" may be used for all benign epithelial tumors of the colon and the rectum, then polyps may be divided into categories determined by their morphologic, pathologic and clinical features. A simple classification is that of McCarty which follows:

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- A. Adenomas (Figs. 1 and 2)
 - Pedunculated, single and multiple
 - 2. Sessile, single and multiple
 - 3. Familial multiple polyposis coli (Figs. 3, 4 and 7)
- B. Villous papilloma (Fig. 6)
- C. Polypoid vegetations or pseudopolyps (Figs. 5 and 8)

Adenomas are generally compact spherical masses that result from the proliferation of the mucosal glands of Lieberkühn. They may possess a pedicle or be sessile and they may be single or multiple. It has become apparent that the incidence of multiplicity of adenomas is greater than previously appreciated. In the study of patients with adenomas at the University of Minnesota it was found that 38 per cent had two or more adenomas on one or more examinations. Bacon found 33 per cent of 200 patients undergoing exploration for a colonic polyp to have multiple polyps. Familial polyposis or dif-

fuse adenomatosis is a hereditary disease in which the colon and the rectum usually harbor hundreds of true adenomas. While family histories of polyposis are not always obtained it is generally believed that this disease is the result of gene mutation which is transmitted usually as a Mendelian dominant characteristic by which there is a peculiar tendency of the epithelium of the bowel toward pathologic proliferation. The polyps generally develop about the age of puberty although they may occur earlier or later.

Villous papillomas are differentiated from true adenomas by differences in morphology, cancer potential and clinical behavior. Villous papillomas are often also referred to as papillary adenomas and, while they do arise from the mucosa of the bowel, the glandular elements are less prominent than in the typical adenoma. Dukes has advanced the theory that the villous papilloma is the end result of a growth pattern which has affected mainly the superficial epithelium in contrast to

Fig. 1. Below, Pedunculated multilobed benign adenoma.

Fig. 2. Right, Multiple benign adenomas of descending colon.





the adenoma which is the result of a growth pattern affecting mainly those cells at a deeper level. The villous configuration is the result of the increased mucoepithelial surface. Villous papillomas are ordinarily sessile with broad bases and have a soft, velvety consistency.

Pseudopolyps are of inflammatory origin and occur commonly in cases of ulcerative colitis. They are not neoplastic but are the result of the destructive processes of ulcerative colitis in which ulceration of the mucosa occurs. The ulcers undermine the mucosa and eventually coalesce leaving small islands or tags of mucosa which exhibit a marked inflammatory reaction. As healing occurs fibrous connective tissue is laid down with subsequent contraction producing the polypoid appearance. Pseudopolyps are found most commonly in long-standing chronic cases of ulcerative colitis but they may be seen in early acute cases. Bacon1 has reported a 53.7 per cent incidence of pseudopolyps in 108 patients undergoing colectomy for ulcerative colitis.

The relationship of pseudopolyposis to the development of carcinoma in patients with ulcerative colitis is a controversial subject. It is doubtful that pseudopolyps are themselves premalignant and the effect of the extensive and diffuse inflammatory process is debatable; however, most observers agree that carcinoma occurs more frequently when pseudopolyposis is present. In Bacon's¹ series of patients undergoing colectomy for ulcerative colitis, 76.9 per cent of those having concomitant carcinoma showed pseudopolyposis.

At this point we should like to digress briefly to mention a misnomer in anorectal pathology which is occasionally encountered. Not too infrequently clinicians and occasionally pathologists apply the term "anal polyp" to a hypertrophied anal papilla. This is an inaccurate and misleading term which should be discarded. Anal papillae are embryologic remnants arising just distal to the mucocutaneous junction and are originally small tags of anoderm.



Fig. 3. Left, Roentgenogram of colon showing diffuse familial adenomatosis.

Fig. 4. Below, Resected colon showing diffuse familial adenomatosis.



With repeated trauma and inflammation they may become fibrotic and assume a somewhat polypoid appearance; however, they remain covered with modified skin and not mucosa. They have no malignant potential and are in no way related to mucosal polyps. All physicians are urged to delete the term "anal polyp" from the nomenclature and use instead the correct term "anal papilla."

Incidence of Carcinoma

The most important single factor in the management of adenomatous polyps of the rectum and the colon is the incidence of carcinoma. There are many terms in use describing the type of malignant change found in adenomatous polyps; however, most surgeons and pathologists agree that, with a few exceptions, the important pathologic change to be noted is whether or not invasion of the muscularis mucosa has occurred. For that reason we

prefer to divide adenomatous polyps into three categories, namely: benign adenoma, adenoma with carcinoma without invasion (carcinoma in situ, adenoma malignum) and adenoma with carcinoma with invasion.

There are wide variations in the reported incidence of malignant change in adenomatous polyps. In the series reported from the University of Minnesota7 454 lesions were biopsied through the proctoscope and only three were diagnosed adenoma with malignant change without invasion while 12 were adenoma with malignant change with invasion. Bacon³ has reported an incidence of 3.4 per cent for invasive carcinoma and 11 per cent for carcinoma without invasion (in situ). Scarborough and Klein report a similar incidence of 11 per cent; and Castro, Ault and Smith, an incidence of 45 per cent.

Villous papillomas present a different picture from the simple adenomas when the incidence of malignant change is con-



Fig. 5. Resected colon showing extensive pseudopolyposis in chronic ulcerative colitis.



Fig. 6. Benign villous papilloma of sigmoid.



Fig. 7. Adenocarcinoma of the rectum in diffuse familial adenomatosis.

sidered in the villous type alone. Ewing has found from 10 to 20 per cent of villous papillomas to have malignant degeneration; Welch, McKittrick and Behringer have shown that malignancy is demonstrable in 22 per cent of villous papillomas as compared with 17 per cent of pedunculated adenomas. Bacon² found 35.7 per cent of villous papillomas to have either focal adenocarcinoma or proliferating areas of well differentiated adenocarcinoma without gross or preoperative evidence of malignancy including biopsy. Sunderland and Binkley reported their findings of malignant degeneration in 68 per cent of villous papillomas.

The malignant potential of diffuse adenomatosis or familial polyposis of the colon has long been recognized. The high incidence of frank carcinoma at initial exploration usually places these cases in the cancer category. Flotte, O'Dell and Coller found 50 per cent of patients with adenomatosis to have carcinoma of the colon at operation. Bacon⁴ reported a

carcinoma incidence of 82.7 per cent in his series of cases of diffuse adenomatosis. and it is generally conceded that, if left long enough, 100 per cent of these cases will develop carcinoma. Colectomy is the accepted treatment for diffuse adenomatosis; however, some controversy exists in the management of the rectal segment, that is, whether total colectomy and proctectomy or colectomy with ileoproctostomy should be done. There is considerable evidence available showing that adenomas recur and carcinoma may develop in a retained rectal segment which has previously been cleared,4,9 and it is apparent that an adequate operation for total cure should include proctectomy; however, most authors agree that in selected cases the rectal segment may be left. These cases are those in which there are few enough rectal adenomas that they may be completely removed locally; the ileoproctostomy is performed low enough that the entire remaining rectal segment may be easily visualized proctoscopically; there

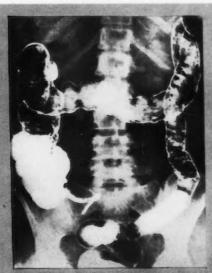


Fig. 8, Roentgenogram of colon showing chronic ulcerative colitis with pseudopolyposis.



Fig. 9. Coloscopy through splenic flexure incision. (From Baker, Margetts and Schutt: Ann. Surg. 141:693, 1955.)

has been no carcinoma in the rectum or rectosigmoid; and the surgeon is confident that adequate, prolonged follow-up will be maintained.

Clinical Study

The authors have recently reviewed a personal series of 100 consecutive patients with adenomatous polyps or villous papillomas of the colon and the rectum. These have been reported in detail elsewhere13 and a summary of the findings is presented here. Excluded from this series were all patients with small adenomas which were fulgurated without biopsy, satellite polyps removed with carcinomas, adenomatous polyps which were grossly altered by malignant invasion so that the architecture of a polyp was not retained, and other polypoid lesions such as carcinoids, leiomyomas, lymphoid hyperplasias, etc. In each instance, whether single or multiple, the lesions were felt to be grossly and clinically benign. The method of treatment chosen in each case was based on that assumption.

The gross pathology encountered was basically of two types: the simple adenoma with or without a pedicle and the broadbased, villous papilloma. Each was reasonably soft, flat or pedunculated, movable and nonulcerated except possibly for small areas of erosion on the surfaces. The microscopic diagnoses included benign adenoma, including adenoma with atypism; adenomatous polyp with adenocarcinoma in situ or noninvasive adenocarcinoma; benign villous papilloma; villous papilloma with adenocarcinoma, noninvasive; and adenoma or villous papilloma with invasive adenocarcinoma which usually was designated Grade II adenocarcinoma. In this series we have included in the general group of "malignant polyps" all polyps having any area of adenocarcinoma; however, special mention will be made of those having invasive carcinoma.

Distribution

In this series of 100 consecutive patients there were 61 women and 39 men. The ages ranged from 3 years to 74 years. The average age was 51.5 years.

Multiple polyps were found in 29 patients; the rectum alone was the site for multiple polyps in 18 of the 29 patients and 11 patients had multiple polyps in either the colon alone or both the colon and rectum. The distribution of polyps is shown in Table I.

Treatment and Results

For discussion of the management of polyps of the rectum and the colon we may divide them into two large groups: those which lie below the peritoneal reflection, that is, distal to the upper rectum, and those lying above the peritoneal reflection or in the abdominal portion of the colon. These groups may then be divided into adenomas and villous papillomas.

I. Rectal polyps. There were 47 cases of adenomas lying below the peritoneal reflection. In all of these cases the adenomas were totally excised by snare or biopsy forceps followed by fulguration. Of these, 18 contained adenocarcinoma and three of the 18 had invasion of the pedicle. Of the 15 without invasion there was one patient who developed an adenocarcinoma of the rectum four years after local excision. This patient died postoperatively after a combined abdominoperineal excision. There has been no evidence of recurrence in any of the other noninvasive cases. One of the three patients with invasion of adenocarcinoma in the pedicle had a local recurrence about four months after excision and fulguration. Her general condition was poor and further surgery was not recommended. She died shortly thereafter from other causes. The other two patients with pedicle invasion have had no evidence of recurrence two and three years after local excision.

II. Rectal villous papillomas. Villous papillomas were found below the peritoneal reflection in 11 patients. In all of these excisional biopsy with fulguration was done. Four were benign, Each of these was totally excised and fulgurated locally, usually under anesthesia in the hospital. There has been no recurrence. Of the seven villous tumors exhibiting malignancy, three were considered invasive.

TABLE I
DISTRIBUTION OF POLYPS IN 100 CASES

	Be	Benign		Adenocarcinoma			
	Adenomas	Vill. Papill.	Adenomas		Vill. Papill.		
			Invas.	Noninvas.	Invas.	Noninvas	
Rectum	29	4	3	15	3	4	
Sigmoid	17	3	4	9			
Descending Cole	on 3		0	2			
Transverse Colo	n 3						
All Segments	1						
Total	53	7	7	26	3	4	

One of these had local excision with fulguration. Eight years later a small recurrence was fulgurated and the patient has now been well for six years. The second had an initial local excision with fulguration and has shown no evidence of recurrence for seven years. The third refused further treatment after the first initial biopsy; six months later this patient had an obstruction and a combined abdominoperineal excision was done. There were regional node metastases. There was local recurrence in six months and the patient subsequently died. Of the four noninvasive malignant villous papillomas one had an initial combined abdominoperineal excision because of the size of the tumor. This patient has been well for 16 years. Each of the other three patients had initial local excision and fulguration. One of these had a recurrence five years later; the biopsy diagnosis was adenocarcinoma and a combined abdominoperineal excision was performed. There has been no evidence of recurrence for nine years. Another patient had a local recurrence 10 years after the initial excision and fulguration. Biopsy of this recurrence was reported benign villous papilloma and complete fulguration was carried out. There has been no recurrence for 12 years. The third had local excision and fulguration and was lost to follow-up two vears later.

III. Colonic adenomas and villous papillomas. The surgical treatment of adenomatous polyps lying above the peritoneal reflection or within the abdomen requires a full major preoperative preparation and an exploration of the peritoneal cavity. The bowel must be cleansed and sterilized in the accepted manner and the surgeon must be prepared to carry out an extensive and radical procedure if unsuspected or undiagnosed cancer is found. In all instances the abdomen is opened widely and the entire colon is examined by palpation and inspection. If a grossly malignant lesion is found, the proper resection is carried out. If not, it is our policy to do total coloscopy using a sterile sigmoidoscope through two or more colotomy incisions. If the suspected adenoma can be palpated through the bowel wall, the site is marked and then the colon is mobilized sufficiently to permit easy access for the sigmoidoscope. The bowel is then opened at the site of the adenoma after rubber-shod intestinal clamps have been applied to each side of the colotomy site and the peritoneal cavity walled off to prevent possible spillage and contamination. As soon as the adenoma is excised, it is sent to the pathologist for frozen-section examination of the pedicle or base. The rubber-shod clamps are removed and the sterile sigmoidoscope is inserted both proximally and distally and the entire interior of the colon is inspected from cecum to proximal rectum. If one suspects a polyp near the splenic flexure and mobilization of the 'splenic flexure is performed, it is frequently possible to perform total coloscopy through a single splenic flexure incision if the sigmoid is sufficiently mobilized to permit the bowel to be threaded onto the sigmoidoscope. The hepatic flexure and ascending colon are usually sufficiently mobile to be easily accessible to the sigmoidoscope. Ordinarily, however, two incisions are made in the colon; the first in the midsigmoid and the second in the transverse colon. Additional incisions should be made if necessary (Fig. 10).

In this series there were three villous papillomas of the colon, all in the sigmoid. Because of the broad bases and X-ray evidence of irregular surfaces primary resections were performed. There have been no recurrences

There were 39 patients with adenomas of the colon. Twenty-four of these had the histologic diagnosis of benign adenoma and in 15 adenocarcinoma was present. Four of these 15 had invasion of the pedicle.

In 31 of the 39 patients initial colotomy with polypectomy was performed. Of the 31 cases, 22 were benign and nine were malignant. One of these malignant polyps was diagnosed carcinoma in situ. Two years later, however, there was recurrence with frank adenocarcinoma for which resection was done. Two of the nine malignant adenomas had evidence of invasion on permanent sections. These two were subjected to resection about eight days after the initial surgery. One patient had invasive adenocarcinoma found in a sigmoidal adenoma which had been excised through the sigmoidoscope. Sigmoid resection was performed. The fourth case of invasive adenocarcinoma was that found in a very large sigmoidal adenoma which was producing obstruction by its size. Resection was performed in two stages. Primary resections were carried out in six additional patients with adenomas. Two of these were benign. In one a preoperative biopsy through the sigmoidoscope was reported adenocarcinoma but the postoperative specimen was benign. The other was a case of benign diffuse adenomatosis in which total colectomy was performed. Four of the patients having primary resections had adenomas demonstrating non-

invasive carcinoma. Two had preoperative sigmoidoscopic biopsy reports of adenocarcinoma but postoperative pathologic diagnosis of carcinoma in situ; one patient had two adjacent adenomas, one pedunculated but rather firm, and a small sessile adenoma. The final patient had an adenoma with noninvasive carcinoma in a sigmoidal segment with diverticulitis for which resection was performed.

In none of the cases of polyps of the colon has there been evidence of recurrence.

Conclusions

With this review in mind we have formulated what we believe to be a sound and logical approach to the management of adenomatous polyps of the rectum and the colon consistent with our present knowledge of this disease process.

 All polyps of the rectum and colon should be removed.

Adenomatous polyps, including villous papillomas, below the peritoneal reflection may be excised locally by snare or biopsy forceps and electrodesiccated. If invasive carcinoma is found in the base of any polyp, a cancer operation should be performed.

3. For adenomatous polyps above the peritoneal reflection, total exploration with coloscopy should be carried out. Pedunculated adenomas should be excised. If possible, frozen sections of the pedicle should be obtained and, if invasive carcinoma is found, immediate resection should be carried out. The same is true if invasive carcinoma is found in the permanent sections, that is, subsequent resection should be performed.

4. Broad-based, large, suspicious tumors above the peritoneal reflection should be treated primarily as cancer.

Segmental resection should be performed for small clusters of adenomas or several adenomas in the same area.

 Postoperatively all patients should be followed closely for the remainder of their lives with routine proctosigmoidoscopic examinations and radiographic studies of the colon.

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Educational Aids

1. Divisions of the American Cancer Society can supply, for use at medical society meetings, an exhibit on *Examination of the Colon and Rectum*, emphasizing the need for such examinations as part of routine physical examinations. The exhibit is 10 feet long, 8 feet high and 2 feet deep and has one 1000-watt light. A replica of approximately half this size will also be available. A booklet on the same subject, giving techniques and detail, has been prepared for distribution to physicians at the exhibit and elsewhere.

II. The Divisions of the Society can also supply, for distribution by physicians to their patients, a brochure Care of Your Colostomy—a Source Book of Information.

BOOKS BY HARRY E. BACON, M.D.

ESSENTIALS OF PROCTOLOGY. Philadelphia. J. B. Lippincott Co. 1943.

Anus, Rectum, Sigmoid Colon; Diagnosis and Treatment, 3rd ed. Philadelphia. J. B. Lippincott Co. 1949.

ATLAS OF OPERATIVE TECHNIC; ANUS, RECTUM, AND COLON [With Ross, S. T.]. St. Louis. C. V. Mosby Co. 1954.

PROCTOLOGY [With Ross, S. T. and Recio, P. M.]. Philadelphia. J. B. Lippincott Co. 1956.

ULCERATIVE COLITIS. Philadelphia. J. B. Lippincott Co. 1958.

Plea for Early Diagnosis in Cancer of the Colon and Rectum

Harry E. Bacon, M.D., and Julius L. Berkley, M.D.*

Though worn thin by the battering they receive in the hopper of reiteration, well known facts bear a weight of authority that cannot be ignored. One of these facts is that the management of cancer, in its role as killer second only to heart disease, constitutes a major problem for the medical profession. Another is the fact that it strikes with particular frequency at younger age groups. A third is that the malignant potential of premalignant lesions is not viewed with the gravity it deserves and steps are not taken early enough to eradicate such lesions. Though premalignant lesions can usually be detected early and eradicated by simple means the tragic fact is that they are too often overlooked or not properly evaluated.

We can look back with some degree of sad retrospection over the past two decades of medical progress in the diagnosis and treatment of cancer of the colon and rectum. For how much has been gained when 33,000 persons still die annually of this dread disease? It is common knowledge that malignant tumors in these situations are of higher incidence than in any other internal organ common to both sexes. The tragedy is that the rectum and colon are most accessible to palpation, endoscopy and radiologic evaluation. As a matter of fact, 80 per cent of all malignant tumors of the large bowel are within the distal 25 cm. Even more appalling is the fact that 68 per cent of these cancers are within reach of the examining finger. We take credit for using the gastroscope, bronchoscope, cystoscope and the intricate Papanicolaou smear technique, all the while ignoring the simple employment of the finger and a hollow lighted tube called the sigmoidoscope. The dead and dying bear witness to this neglect.

It is often said and written that the present greater cancer consciousness accounts for the increase in reported incidence around the clinical world. This increase may, however, be more apparent than real. It may be a distorted picture drawn by the greater longevity effected through modern medicine, increase in medical care inherent in higher socioeconomic levels and a public awareness manifested by insistence upon frequent cancer tests. It may be true that responsibility for the lag of months between onset of symptoms and the first visit to the physician is divided between the physician and the public. Awareness of danger on the part of the public is no guarantee that the first physician consulted will be as alert. It is well enough to educate the public to seek medical advice or periodic examination. But of what value is such education of the patient if we, the physicians, hibernate in ignorance and treat hemorrhoids without inspecting the higher levels of the colon where too often a polyp or a cancer lurks. Ultimately the responsibility remains the physician's, not the patient's. Not only delay and procrastination, but worse-sheer ignorance wedded to a lack of an inquiring mind-still flourish within the profession and contribute to the morbidity and mortality statistics. A major prerequisite in reducing cancer mortality is a keenly developed sense of responsibility in the physician for seeking out, recognizing and eradicating all potential malignant lesions. There is, unfortunately, too much truth in the saying that the fate of the patient with cancer is settled when he leaves the office of the doctor he first visits. This statement is deep with meaning.

At this point it would be well to make a plea for abeyance of the clamor for socalled rights between the general physician and the specialist. This intraprofessional bickering should be superseded by the atti-

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tude that all who practice medicine are not only entitled but obligated to examine or direct for examination every patient who presents even the remotest complaint or sign or symptom relating to the intestinal tract.

With recognition of these facts the plea for early diagnosis is again reiterated. It behooves us to allow no patient, irrespective of age, to be lost in the abyss of neglect or procrastination. And it behooves us all to bear in mind that adenomatous polyps—premalignant lesions—carry with them a high malignant potential and can be demonstrated in one third of all persons over the age of 45.

What are the signs and symptoms that are being overlooked? Certainly not the obvious ones, for everyone is familiar with the clinical picture of advanced cancer. Yet bleeding from the bowel—a flagrant danger sign—has again and again been ignored or misinterpreted with a resulting delay of dangerous potentiality.

The pathologic physiology is the source of these early warning signs. The lumen of the right colon is large and here tumors tend to fungate, ulcerate and bleed insidiously. Despite the size of the tumor, the large lumen and liquid content militate against obstruction and it seldom occurs. This applies as well to the transverse colon. Abdominal pain is more commonly suggestive of peptic ulcer or diseased appendix. Change in bowel habit is the most common symptom of malignant tumor although lassitude, fatigability, cachexia, vomiting and the presence of a palpable mass are not uncommon.

The left colon is the storage site for thickened feces, the lumen becoming narrower distally. Tumors tend to encroach upon the diameter of the lumen either by encirclement or by exophytic growth, producing varying degrees of obstruction. As a cardinal symptom abdominal pain of varying intensity is less likely to be associated with food intake when the left colon is involved than is the case with the right colon. Proximal inspissation of feces by the partially obstructing growth with associated mucosal irritation may lead to alternating constipation and diar-

rhea, a symptom complex that must be highly respected and one that warrants thorough investigation.

Bleeding of varying degree is an ominous sign never to be ignored. In cancer of the rectum bleeding is one of the first signs. Change in bowel habit, by which is meant an alteration of or deviation from what is normal for the individual patient, is extremely common. The rectal ampulla is large enough to accommodate a fairly large tumor usually without completely impeding the fecal flow, although an early symptom may be described as a sense of fullness, lower abdominal discomfort on awakening in the morning and associated with a false urge to stool. Frequent desire for, and incompleteness of, evacuation that cause the patient to return to the toilet are common complaints. Pain is not a feature of rectal cancer but it is cited frequently with lesions of the anal canal since this area has somatic innervation. Therefore, vague abdominal discomfort, bleeding by rectum, change in bowel habit, weakness, fatigue and loss of weight otherwise unaccounted for should immediately alert the physician to rule out cancer of the large bowel before proceeding with either medical treatment or definitive anorectal surgery. This is of the greatest importance, for it is a well documented fact that cancer tends to desquamate free viable cells from tumors situated at higher levels with their implantation upon hemorrhoidectomy wounds. Careful preliminary investigation of the proximal bowel may spare one the embarrassing revelation of the primary cause of the bleeding.

What constitutes a complete diagnostic large bowel examination? Inspection of the anal area is the first step in the search for the suspicious ulcer of a squamous cell carcinoma or the dark lesion of a rare melanoma. Digital examination should be performed by every physician whether he be general practitioner or specialist. It requires barely two minutes and, though it may be embarrassing to the patient, is the first line of offense. The lubricated finger is gently inserted into and through the anal canal and, with a sweeping movement around the circumference, advanced

to its full extent. The importance of this step cannot be overemphasized since 68 per cent of all cancers of the distal 25 cm. of the bowel and 50 per cent of lesions of the entire colon can be felt by the examining finger.

Sigmoidoscopy can and should become a part of each physical examination, in fact, this procedure should not be reserved for the specialist. It may require a change of clinical procedure, but every physician's office, every clinic and hospital should be equipped with the instruments necessary for proctosigmoidoscopy to be employed routinely even in all asymptomatic individuals over 35 years of age-and every physician should be trained to use them competently. The hazard of injury to the patient can be eliminated through proper instruction and technical facility. It is not important that a lesion be identified pathologically, but it is important that it not be overlooked. With reasonable gentleness and precaution, the scope can be introduced and the bowel inspected for the full distance of 25 cm. Cancer usually appears as a cauliflower-like or ulcerating friable mass that bleeds easily. Grossly, it looks malignant. The sanguineous discharge usually is the color of brick dust and emits a mephitic odor. If means are available, a biopsy specimen should be taken as it is a definitive means to diagnosis. The bleeding caused by biopsy usually is of small consequence.

X-RAY EXAMINATION of the colon is done by opaque and air-contrast technique. It is extremely important because it permits visualization of the large bowel from the sigmoid to the cecum. It can be performed during active bleeding if necessary but, as such a situation rarely occurs, the bowel in the majority of cases can be given preliminary cleansing for better visualization. It should be instituted in patients over 35 years of age for investigation of bowel complaints and preliminary to operation for anorectal pathology. It should be remembered that multiple bowel cancers and premalignant lesions may be present that cannot be found on proctosigmoidoscopy. The procedure of a gastrointestinal barium meal should never be carried out for investigation of a large bowel lesion but may be part of a complete intestinal survey. Flooding of the rectal ampulla tends to hide small defects, and prior sigmoidoscopic visualization will aid and corroborate this portion of the study. The typical cancer above the rectum is described as a constant filling defect with a narrowed, rigid lumen, the ends of the constricted area being ragged and concave and the mucosal pattern irregular-the socalled apple-core type of deformity. If obstruction exists, its level can be noted but occasionally obstruction can be precipitated by the opaque and air-contrast procedure from below as well as by barium from above. The possibility of perforation through an ulcerated area during introduction of barium or air is always to be kept in mind. The radiologist is often reluctant to commit himself on defects

METHOD OF SIGMOIDOSCOPY

- A. First Step: Introduction of tip of the sigmoidoscope through the anal canal, Patient in knee-shoulder or inverted position.
- B. Second Step: Instrument passed under direct vision toward the sacrum.
- C. Third Step: Under direct vision the sigmoidoscope has been advanced into the sigmoid colon.



TABLE I

CANCER OF THE COLON, RECTUM AND ANAL CANAL
(Author's Series 1940–1958)*

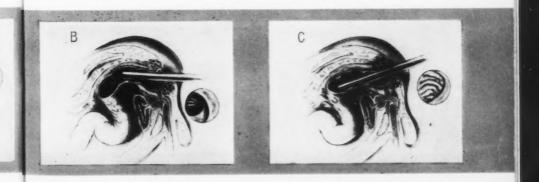
τ	Number Undergoing Resection	Number Deaths from Resection	Mortality Rate Per cent	Survival Rate Five Years	Survival Rate Ten Years
Cecum, ascending colon and hepatic flexure	52	2	3.8	58.0%	
Transverse colon and splenic flexure	32	1	3.3	53.3%	
Descending colon and sigmoid	357	12	3.3	68.6%	56.5%
Low sigmoid, rectosigmoid and upper rectum: abdominoperineal procto sigmoidectomy		25	3.9	55.1%	39.2%
Low rectum (lowest 4 cm. Miles abdominoperineal excision	394	13	3.2	49.6%	38.5%
Anal canal	63	1	1.6	41.3%	
Total	1540	54	3.5%		

^{*}Total number patients, 1814; total number operated upon, 1670 (including total iliocoloproctectomy for adenomatosis with cancer and ulcerative colitis with cancer).

resembling polyps that are less than 1 cm. in size or may request re-examination of a suspicious area. In such an event the reasons should be explained to the patient and full cooperation obtained both from the patient and the referring physician. This is important for early diagnosis as many patients, because of ignorance, fear or finances, fail to return and doctors tend to delay or forget during the pressures of a

busy practice. A systematic follow-up is an effective aid in preventing such lapses. With all patients examination of the abdomen should be made together with palpation for nodes in the inguinal region and the left supraclavicular fossa. In the search for early cancer, the watchwords are, "Be sharp, look sharp and think sharp."

Surgical eradication is the accepted treatment for cancer of the large bowel.



In general, right-sided lesions are excised as a right hemicolectomy. Those involving the transverse colon are removed by an extended resection including the hepatic and splenic flexures while similar growths on the left are extirpated by a hemicolectomy, all with immediate, open, end-toend anastomosis. The fear of an abdominal colostomy has been lessened by changing concepts in the surgical treatment for cancer of the rectosigmoid and upper rectum. Resection with immediate anastomosis, endorectal resection and abdominoperineal proctosigmoidectomy without colostomy and with preservation of the sphincter have proved their worth as cancer operations, as shown by the survival rates recorded by Babcock, Finsterer, Waugh, Black, Best, Wilensky, Mandl, Recio, Hallenbeck and Bacon (Table 1). The Miles abdominoperineal excision with abdominal colostomy must be regarded as the only acceptable operation for lesions of the distal 7 cm, of the rectum and for anal malignant tumors.

The removal of an extended segment of bowel because of the frequency of multiple growths found by coloscopy at the time of operation with inclusion of suspiciously involved organs and structures, excision of a wide expanse of mesocolon and meticulous removal of the node-bearing tissue from the duodenum to the obturator foramen, have increased the rates of survival without affecting the morbidity or mortality.6 The "second look" popularized by Wangensteen, has shown a salvage rate from reoperation as high as 17 per cent. Primary ligation of the inferior mesenteric vein to prevent spread of cancer cell emboli, serosal covering of the growth with proximal and distal ligation of the bowel to avoid intraluminal desquamation, and the intraluminal injection and intraperitoneal wash with clorpactin XCB to prevent recurrence, have been added to our procedures in an effort to give the patient a better chance of survival.

We have probably reached the pinnacle of our surgical efforts. But still too many curative operations are returning to the "nest of recurrence." Until the cause of cancer is discovered, every effort must be made to diagnose this killer before fatal spread has occurred.

Although we must accept cancer as one of the burdens of life, we owe it to Miles and others that their selflessness and devoted efforts shall not have been in vain. Let us increase the salvage rate not by bigger resections, nor by more biological antidotes but by EARLIER DIAGNOSIS.

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Carcinoma of the Large Bowel and Rectum

The Vicksburg Hospital, a small nonuniversity institution, admits about 4000 predominantly surgical patients annually. The hospital is staffed by the Vicksburg Clinic. There are approximately 40,000 outpatient consultations per year. In 1957 4100 tissue specimens were examined in the Laboratories of Pathology, from all sources and of these, 313 were found to be cancer.

For many years this hospital has conducted an approved Tumor Clinic, which meets weekly. At this time, patients having, or suspected of having, malignant disease as well as follow-up patients are presented. The Tumor Clinic staff consists of two general surgeons, one internist, one

roentgenologist, one pathologist, one orthopedist, two bronchoscopist-otolaryngologists, two ophthalmologists, one neurosurgeon and four fellows in surgery. Except for the fellows in surgery, all are diplomates of their respective Boards. Approximately 12 patients are seen at each meeting. There is a full-time secretary. Adequate radium and conventional deep roentgen therapy are available.

All new patients are presented by the third-year fellow in surgery who is responsible for their diagnostic work-up. Follow-up patients are presented by the second-year fellow in surgery who reviews the pertinent interim data and their current status. The patients are seen by the entire group and the consensus regarding the diagnosis and proper therapy of each patient is determined and recorded.

There are constantly available 20 beds for service patients in the charge of the

From The Tumor Clinic, The Vicksburg Hospital, Vicksburg, Mississippi, Participants: Willard H. Parsons, M.D., Director and Chief of Surgery; Sae Soon Lee, M.D., Chief Resident in Surgery; Robert M. Moore, M.D., Director, Department of Pathology; Fred J. Hamernik, M.D., Director, Department of Roentgenology.



Fig. 1



Fig. 2

chief resident in surgery who has responsibility for their total care, but also has available complete consultation service. About 500 patients each year are cared for on this service.

Annually, the total experience is summarized. At intervals during each year particular cancers of certain sites are discussed. On this occasion, carcinoma of the large bowel, including the rectum, will be considered.

Case 1.

DR. LEE: This 34-year-old white man, a chronic alcoholic, came for consultation because of epigastric pain, weakness and nervousness. Many years ago an appendectomy was done. About one year prior to consultation the patient noticed mild epigastric distress, with burning and belching which occurred after meals. Four months later, he had severe epigastric pain with nausea but without vomiting or hematemesis. Three months before consultation the patient was seen elsewhere, at which time he was informed that he had a duodenal ulcer. The depressed hemoglobin level (8.4 gm./100 ml.) was considered the result of a bleeding ulcer, although melena had never been noted. He was treated elsewhere by the administration of antacids and vitamin compounds, without improvement. There had been no change of bowel habits and there was no history of tarry stools. There had been a weight loss of 25 pounds during the preceding eight months. Three weeks before consultation here, the patient was again examined elsewhere. The hemoglobin was reported to be 7 gm./100 ml., and he was given 1500 ml. of whole blood. Another gastrointestinal series showed a healed duodenal ulcer. On admission to this hospital the patient's blood studies included: hematocrit, 32 per cent; total leukocyte count, 13,100; hemoglobin, 10.6 gm./100 ml., with hypochromic anemia. Physical examination was essentially negative. Certainly, this patient deserved a comprehensive study. The anemia, in my judgment, was not due to duodenal ulcer.

Dr. Parsons: What studies do you think should have been made?

DR. LEE: He should have had a barium enema. If there was no obstructive lesion, the gastrointestinal series should have been repeated. The stools should have been examined for occult blood.

Dr. Parsons: Dr. Hamernik, will you give your findings?

DR. HAMERNIK: A flat film of the abdomen and a subsequent gastrointestinal study with bariopaque media (Figs. 1 and

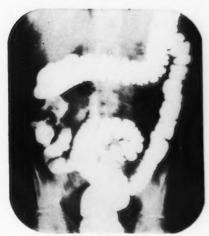


Fig. 3



Fig. 4

2) showed a healed ulcer of the duodenum with marked irregularity of the ascending colon and cecum. A subsequent barium enema study (Figs. 3 and 4) confirmed the diagnosis of a large intrinsic lesion of the proximal large bowel, which I believe represented a carcinoma of the cecum.

DR. PARSONS: There were several interesting features connected with this man's illness. He was relatively young to have carcinoma of the bowel. One or two errors had been made in his management. Elsewhere, he was correctly said to have a duodenal ulcer, but, unfortunately, it was incorrectly assumed that the anemia present was due to blood loss from the ulcer. Dr. Lee shrewdly suspected that not to be true and Dr. Hamernik felt he had been able to demonstrate a carcinoma of the right colon. Probably that was correct but I would entertain the idea that this man might possibly have had a granuloma about the cecum subsequent to appendectomy with invagination of the stump with a silk suture. On one occasion I have encountered such a lesion and the clinical picture and X-ray findings were very similar to this patient's picture. Presumptively. this patient had carcinoma of the cecum and, at exploration, carcinoma of the cecum was found and radical right hemicolectomy was done.

Dr. Moore: The gross specimen consisted of a 10-cm, section of terminal ileum, cecum, ascending colon and proximal half of the transverse colon. The entire cecum and first part of the ascending colon were greatly thickened, averaging 2.5 cm., and consisted of firm, granular, grayish-white tissue. The mucosal surface of the tumor was ulcerated and the lumen was greatly narrowed. The serosal surface was not involved and there were no demonstrable nodes in the attached mesocolon. Microscopically the tumor consisted of fairly well differentiated glandular epithelium with gland formation, and the secretion of small amounts of mucin. There was no demonstrable vein invasion. Diagnosis: Adenocarcinoma, Grade III.

DR. PARSONS: This patient demonstrates the necessity of doing complete diagnostic studies. The fact that a patient has one lesion does not preclude the presence of other lesions. Blood loss is always significant, and, indeed, it is blood loss that most often brings patients, who have carcinoma of the large bowel, particularly the rectum, for consultation.

Case 2.

DR. LEE: This 56-year-old white man, in March 1948, six months prior to con-

sultation, noticed alteration of bowel habits with increasing constipation, general fatigue and vague discomfort in the epigastrium. At that time a barium study was made of the colon and the man was thought to have diverticulosis and diverticulitis of the sigmoid colon. Sigmoidoscopic studies were negative. He was advised to have re-examination in the fairly immediate future. Physical examination (September, 1948) was not remarkable. The laboratory studies yielded results within normal limits, Increasing constipation and tarry stools had occurred. Clinical diagnosis: Carcinoma of the sigmoid,

DR. HAMERNIK: Fluoroscopic examination of the large bowel showed the rectum to fill easily and smoothly. In the proximal sigmoid colon there was an area of deformity, narrowing and irregularity of the mucosa, but there was no obstruction and the barium flowed freely into all segments of the large bowel and no particular tenderness was noted. The subsequent pre- and postevacuation film studies (Fig. 5) verified the fluoroscopic findings. There were undermined edges with a narrow constriction of the proximal sigmoid colon, highly suggestive of a cancer. This had the characteristic napkin-ring appearance of scirrhous carcinoma.

DR. PARSONS: It was the consensus that surgical exploration ought to be done. A typical napkin-ring carcinoma of the sigmoid colon was demonstrated and radical anterior resection was accomplished September 20, 1948.

DR. Moore: The gross specimen consisted of a 16-cm. section of large bowel having a firm, granular, grayish-white growth almost encircling the wall in its midportion. The mucosal surface was ulcerated. The tumor measured 3 cm. in width and caused marked narrowing of the lumen. The serosal surface was not involved. There were no demonstrable nodes in the attached mesocolon. Near the proximal end there was a pedunculated polyp 5 cm. in length and 8 mm. in diameter, Microscopically, the tumor consisted of well differentiated glandular epithelium with gland formation and the secretion of some

mucin. It was limited to the mucosa and submucosa and there was no demonstrable vein invasion. The polyp was benign. Diagnosis: Adenocarcinoma, Grade II.

DR. PARSONS: There is little to be added. An initial error was made in that the man was thought to have diverticulitis of the sigmoid colon rather than carcinoma, which he actually did have. Fortunately, this patient is living without demonstrable disease ten years after resection.

Case 3.

DR. LEE: A 56-year-old white man was seen in January, 1955, complaining of bloody stools and straining after defecation. About 17 months prior to consultation, he developed mild constipation, which was treated with various home remedies. Five months before consultation, he noticed increasing straining at stool, frequency of bowel movements and bright red blood on the stools. Occasionally the size of the stool decreased. Two months before consultation here this man was seen by his local physician, was told he had hemorrhoids and was advised to take mineral oil. Two weeks before consultation he was examined by a second physician who found a lesion of the rectum, which was biopsied. The patient was referred here with a positive diagnosis of carcinoma of the rectum. Physical examination was negative except for study of the rectum. There was a firm, friable, ulcerated mass on the left rectal wall approximately 4 cm. proximal to the dentate margin. About one half the circumference of the bowel was involved. The upper half was freely movable; the lower half was attached to the prostate. The total leukocyte count was 12,700, the hemoglobin was 17 gm./100 ml, All other laboratory studies were negative. Proctoscopic studies and biopsy confirmed the diagnosis of carcinoma of the rectum.

DR. PARSONS: Probably, in 80 per cent of patients with cancer of the rectum, the diagnosis can be made with accuracy by simple digital examination. The roentgenologist cannot help in the diagnosis of



Fig. 5

these low-lying carcinomas. However, if there is no high-grade obstruction, barium studies of the colon are highly desirable to demonstrate other lesions including polyps. It was the consensus that the man should have abdominoperineal resection. The patient, 45 months (September 30, 1958) subsequent to surgery, is living without demonstrable recurrence.

DR. Moore: The gross specimen consisted of a 30-cm, section of large bowel with the anus at one end. At a distance of 4 cm. proximal to the anus, there was an ulcerated tumor involving one half the circumference of the bowel wall and measuring 4 cm. in width with considerable narrowing of the lumen. The serosal surface was not involved. There were no demonstrable nodes in the attached mesocolon. Microscopically the tumor consisted of well differentiated glandular epithelium showing gland formation, and the secretion of some mucin. The tumor was limited to the mucosa and submucosa, and vein invasion could not be demonstrated. The prognosis should be fairly good. Diagnosis: Adenocarcinoma, Grade II.

Dr. Parsons: In this instance, as is so often the case, a patient with cancer of the rectum also had hemorrhoids, and the attention of the attending physician was

confined to the hemorrhoids without further investigation of the large bowel. The history here was classic. The diagnosis could easily have been established and therapy rendered at an earlier date.

Summary

DR. PARSONS: There are significant differences anatomically, physiologically, pathologically and clinically in cancers of the right colon, the left colon and the rectum. The right colon is supplied by the superior mesenteric vessels, the left colon and rectum by the inferior mesenteric vessels. Cancer of the right colon is generally a flat, ulcerative lesion, whereas cancer of the sigmoid typically is a constricting "napkin-ring" type of lesion.

Clinically, cancer of the right colon is characterized by anemia, by loss of appetite and weight and by general weakness. The presence of these symptoms in any patient more than 40 years of age should excite the suspicion of cancer of the right colon and this should be the presumptive diagnosis until proved otherwise. It is tragic that these patients are often thought to have simple anemia and over a period of weeks or months are given various preparations, such as iron, vitamins, etc. The diagnosis can almost always be established positively by the roentgenologist.

Cancer of the left colon is characterized by a change in bowel habits, the patient becoming progressively more constipated. The stools contain blood. As the site of the lesion approaches the rectum, there is bright red blood. There is generally no great anemia. As the obstruction becomes more acute there are episodes of cramp-

ing pain.

Cancer of the rectum is characterized by tenesmus and by bright red blood in or on the stools. Usually the tumor can be felt by the examining finger. It can always be seen through the proctoscope or sigmoidoscope and can be biopsied.

Cancers of the large bowel and rectum offer probably the best prognosis of all major cancers. Failure to make a' digital examination of the rectum in any routine examination is inexcusable.



Dietary Factor in Tumors . . .

Drs. J. White and F. K. Millar of the National Cancer Institute wondered what effect dietary tumor might have on animals. They fed rats a diet containing 24 per cent lyophilized rat carcinosarcoma as a nitrogen source. The diet increased the depressed appetites of rats and increased their weight beyond that of controls—and, in tumor-bearing animals, the diet accelerated tumor growth.

Cancer in Africa . . .

As compared with people in the United States, African (Bantu) men have more cancer of the liver, esophagus and sinuses, as well as more hemangiosarcomas. In women cervical cancer is frequent, cancer of the endometrium rare. Stomach and large bowel cancers are infrequent in both sexes. Lung cancer is as common as in Denmark. These observations were made by Dr. J. Higginson of Johannesburg during a study of an indigenous African community.

Infective Nucleic Acid . . .

Dr. Raymond Latarjet of the Institut du Radium, Paris, has reported inducing cancer in susceptible mice by injection of nucleic acid fractions (mostly DNA, a little RNA and 10 per cent protein) of mouse leukemia virus. The tumors (largely parotid and fibrosarcomas) were foreign to nucleic acid-donating mice. The leukemia in recipient mice was accelerated.

Bladder Cancer Inhibition . . .

Dr. E. Boyland of the Chester Beatty group in London has found evidence that 1,4-glucosaccharolactone may prevent the development of bladder cancer in dye workers exposed to carcinogens and possibly prevent its recurrence postoperatively. Administered orally, the drug inhibited to almost 90 per cent urinary betaglucuronidase, which is excreted in abnormal amounts by most bladder cancer patients. Dr. Boyland's work indicates that urinary metabolites of aromatic amines probably are the carcinogens, not the aromatic amines themselves. The aromatic amines are converted in the liver into a number of products, including o-aminophenols, and are conjugated (detoxified) with sulphate or glucuronate, which are again split off by urinary enzymes, and the end product-2-amino-1-naphthol-is liberated as a carcinogen in the bladder.

Viruses, Carcinogens, Hormones . . .

Perhaps more than any other investigator, the late Dr. Francisco Duran-Reynals of Yale University established the virus theory of cancer. For two decades, the fiery Spanish-American fought passionately with fact and logic against the apathy and skepticism of his colleagues. But at the time of his death by cancer last spring the virus theory was being acclaimed enthusiastically by a rapidly increasing number of scientists. Dr. Duran-Reynals' last paper, presented at the Seventh International Cancer Congress in London, tied together three principal (and at one time considered contradictory) elements of carcinogenesis. He contended that carcinogens, hormones and viruses can be interdependent in the pathogenesis of tumors. Specifically, the paper reported that regressed methylcholanthrene-induced lesions of rabbits can be revived by cortisone, that a (viral?) agent can be recovered from the lesions during (and onlyduring) cortisone treatment, that methylcholanthrene paradoxically now inhibits the methylcholanthrene-induced and cortisone-enhanced lesions, and that vaccinia and methylcholanthrene have a reciprocal modifying action on the lesions. Cosigners of the paper were the scientist's widow, Maria Luisa, and Drs. A. Cuba and E. Bryan.

Anticancer Agents and Healing . . .

One of the problems incidental to prophylactic use of anticancer drugs during and following surgery is the effect on the patient's recovery. Will the drugs retard healing of surgical wounds? Dr. William H. Hardesty of the University of Pennsylvania has tested three drugs—thioTEPA, nitrogen mustard and chloroquine mustard—against standard wounds in rats. His findings: nitrogen mustard, given systemically in toxic doses, retards wound healing in proportion to the dose; moderate does of thioTEPA (intravenously) and chloroquine mustard (intramuscularly) have no significant effect.

Enzyme Test . . .

Rapidly growing cancers have been observed to produce lactic dehydrogenase at a rate roughly proportionate to their speed of growth. Drs. Alice E. Moore and Felix Wroblewski of the Sloan-Kettering Institute, New York, have found this fact of interest in attempting to devise a means of detecting early or asymptomatic, rapidly growing cancers. Because the enzyme level frequently falls with successful treatment, the scientists are attempting to evaluate the enzyme test as a practical prognostic tool.

LUNG CANCER FACTS

[Under this comprehensive caption in this and coming issues of CA will be found capsules of information about lung cancer, prepared by the Administrator for Research on Lung Cancer of the American Cancer Society, which the practicing physician can not afford not to have. Rarely has a vital medical subject been so charged with emotion as the etiology of lung cancer. The American Cancer Society has been criticized, on the one hand, for showing partiality to one position and, on the other hand, for a "do nothing" position. The editors of CA have long been aware

that such criticisms cannot be avoided. By maintaining the correct balance between being overzealous and underzealous the Society feels it is fulfilling its function reasonably well.

When many of today's practicing physicians were in medical school lung cancer was a rare disease. Today it is the most common cause of all deaths from cancer. Nine years ago there were only a few physicians who felt they knew the major causes of the disease. Today investigators in lung cancer research are far ahead of the medical profession in knowledge about causative factors. The rapid expansion of lung cancer research during the past ten

years has widened the gap between the laboratory and the doctor's office.

The public press has placed the physician in the awkward position either of being forced to read all the original literature on the subject or of depending on the same lay publications his patients devour so greedily. It is the purpose of Lung Can-

cer Facts to help correct this situation by presenting factual data as concisely and objectively as possible so that the physician can be equipped to answer wisely questions which may materially affect the life and health of his patients. CA hopes it can be of greater service to the profession in this way.—Ed.]

Do air pollutants or cigarette smoke cause lung cancer?

Both community air pollutants and cigarette smoke are inhaled as particulate matter; Both are inhaled consciously and subconsciously;

Both contain the products of incomplete combustion including known carcinogens, such as 3,4-benzpyrene;

Both are deposited along the tracheobronchial tree, reaching as far as the alveolar spaces;

Both are carried by the whip-like action of cilia on columnar epithelium along with an ever-flowing carpet of mucus toward the trachea;

Both inhibit ciliary activity;

Both contain compounds which penetrate cell membranes and have been recognized in the cells of the bronchial epithelium;

Both produce inflammatory and hyperplastic changes in the bronchial epithelium.

All the above statements can be documented in precise detail in a voluminous literature.

AIR POLLUTANTS AND CIGARETTE SMOKE

	Air Pollutants	Cigarette Smoke	
Particles	Vary greatly in size and composi- tion depending on location, time and atmospheric conditions	Median diameter is 0.5 micron	
Inhalation	Long after formation	Within seconds of com- bustion	
Tissue changes in animals	Experimentally have resulted in increased number of mouse adenomas in susceptible animals	Experimentally, two of its carcinogens have pro- duced human type (epi- dermoid) carcinomas	
Tissue changes in man	Particulate carbon is abundant in peribronchial lymph nodes of city dwellers; comparative studies of bronchial epithelium of urban and rural dwellers are incomplete	Basal cell hyperplasia, metaplasia, atypism, and "carcinoma-in-situ" have been reported as increased in smokers	

How much of the total lung cancer picture in this country can be attributed to each of these environmental agents? While quantitative measurements would be extremely difficult to make, estimates based on several studies are worth noting and will be discussed on these pages in early issues of *CA*.

Members of the profession interested in documentation of any of the facts presented above are urged to write to the Editor.

younger age group and is commonest in the head and neck regions. Over the last five years, lung cancer has increased.

Marcial (San Juan, P. R.): Puerto Rican life expectancy has increased from 40 to 68 years since 1930. Over the same period cancer rose from seventh to second place as a cause of death.

Lapis and Stark (Budapest): Guerin's cancer, transplanted subdermally or intravenously, does not metastasize to liver. If animals are given cortisone or ACTH, however, it does. DOCA did not produce metastases or inhibit ACTH production of metastases.

Shay and others (Philadelphia): Methylcholanthrene, given by stomach catheter, induced breast cancer in young female Wistar rats. A synthetic estrogen, TACE, and a non-steroidal estrogen antagonist, MER-25, prevented the cancers.

Scholefield (Montreal): Decanoate, in the manner of dinitrophenol, uncouples oxidation from phosphorylation in normal tissue mitochondria. In Ehrlich ascites cells, it has little effect on respiratory activity, no effect on the R. Q., and increases aerobic glycolysis 100 per cent and anaerobic glycolysis 10-15 per cent. When glucose is added to the ascites-decanoate preparation, there is a sudden decrease in oxygen uptake. Apparently this chain of events occurs: 1) oxidation and phosphorylation are uncoupled; 2) intracellular hydrogen ions increase; and 3) respiration is almost abolished. Decanoate inhibits both the soluble and insoluble phosphate fractions of ascites cells.

Watkin (NIH): Cancer patients show negative caloric imbalances not reversible by increased food intake -- apparently due to hypermetabolism and the using up of body fat stores.

Greenfield and Price (NIH): Tumor-bearing animals lose blood from vascular lesions near their tumors. Macrophages pick up the extravasated blood and migrate from the area. Animals with marked hemorrhage become cachectic and die early. Animals with little or no hemorrhage maintain weight and die late.

Graff and others (New York): Experimental tumors grow slowly when hosts are kept under reduced oxygen tension to which they have become acclimatized. Lowering oxy-

gen tension appears to increase tumor glycolytic rates but lower host biosynthetic activities. Cancer's high glycolysis is a consequence of the inadequacy of normal respiratory processes, even when the latter operate at top speed.

Sekla and others (Prague): A tumor-inhibiting agent is found both in the serum and spleens of resistant rats repeatedly implanted with Walker 256 carcinoma. The anti-tumor agent can be obtained by incubating resistant rats' reticuloendothelial cells with live tumor cells.

Preston and Henegar (Chicago): Subcutaneous implants of Bagg's lymphosarcoma regress in 25 per cent of the inoculated rats. Serum from these resistant rats protected susceptible animals against intraperitoneal implants of the tumor -- 90 per cent of the controls died, as against 10 per cent of the treated rats.

Barrett (NCI): Data indicate that the erythrocyte membrane, or a big piece of it, carries an antigen capable of being used for mouse tumor immunity. It seems to be associated with the hemagglutinogen and may differ from soluble antigens in important ways. Mice may be immunized with an inoculation of washed erythrocytes or their stroma if the membranes are intacta.

Pressman and Day (Buffalo): Identical or crossreacting antigens exist in Walker 256 carcinoma, Novikoff hepatoma, and Murphy lymphosarcoma, as indicated by localization of fluorescent antibodies. Little or no antigen is found in normal tissues.

Moser, Chalvet and Daudel (Paris): The presence of a K region (a molecular area of unsatisfied valence) explains the carcinogenic activity of 1:2-5:6-dibenzanthracene and its absence explains the non-carcinogenicity of 1:2-3:4-dibenzanthracene. Both compounds, however, interact with cellular proteins, as Heidelberger and Moldenhauer have shown. The two compounds form different metabolites.

Zajdela and Buu-Hoi (Paris): 1:2-bentacridines with a methyl group in the ninth position produce sarcomas in mice; those lacking it don't. Five benzacridines have been tested.

Harris, Shay and Gruenstein (Philadelphia): Prolonged methylcholanthrene by stomach tube has a "definite but as yet undefined effect" on the rat pituitary.

COMING MEDICAL MEETINGS

Date 1959	Meeting	City
Mar. 10-12	American Laryngological, Rhinological & Otological Society	Hot Springs, Va.
Mar. 17-19	National Health Council	Chicago
Mar. 19-21	Alaska Territorial Medical Association	Juneau
April 1-3	American Association of Anatomists	Seattle
April 5-9	American College of Obstetricians & Gynecologists	Atlantic City
April 6-8	American Radium Society	Hot Springs, Va.
April 6-9	American Academy of General Practice	San Francisco
April 10-12	American Association for Cancer Research	Atlantic City
April 12-16	American Physiological Society	Atlantic City
April 12-18	Federation of American Societies for Experimental Biology	Atlantic City
April 13-17	American Association of Immunologists	Atlantic City
April 13-17	American Society for Pharmacology and Experimental Therapeutics	Atlantic City
April 13-18	American Society for Experimental Pathology	Atlantic City
April 13-18	American Society of Biological Chemists	Atlantic City
April 15-17	American Association of Genito-Urinary Surgeons	Absecon, N. J.
April 15-17	American Surgical Association	San Francisco
April 18-21	Texas Medical Association	San Antonio
April 20-23	American Urological Association	Atlantic City
April 20-24	American College of Physicians	Chicago
April 21-23	American Association for Thoracic Surgery	Los Angeles
April 23-25	American Association of Pathologists and Bacteriologists	Boston
April 23-25	Hawaii Medical Association	Hilo, T. H.
April 27-29	Aero Medical Association	Los Angeles
April 30- May 3	Student American Medical Association	Chicago '

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